

Report details:

Project name	ST. GEORGE SOLAR PV PROJECT (Phase I and II)
Project location	Municipality of Silistra, Polkovnik Lambrinovo village, Bulgaria
Document title	Environmental And Social Impact Assessment (ESIA): Volume 3 – Biodiversity Baseline Report
Developer	Rezolv Energy S.A.
Date of issue	February 2024
Document no.	

Document control:

Version	Date	Description / Updates	Author	Reviewer	Approver
0.0	February 2024	Final Draft ESIA	AON	AON	AON

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Acronyms and Abbreviations

Name	Description
AoI	Area of Influence
EIA	Environmental Impact Assessment
EPA	Environment Protection Authority
EPC	Engineering, Procurement and Construction
E&S	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
HUB	Hub substation
GIIP	Good International Industry Practice
GM	Grievance mechanism
IFC	International Finance Corporation
OHTL	Overhead Line
PDA	Project Development Area
PR	Performance Requirement
PS	Performance Standard
PV	Photovoltaic
SCBIM AON	Societatea de Cercetare a Biodiversitatii si Ingineria Mediului AON
SEP	Stakeholder Engagement Plan

1. INTRODUCTION

The **St. George photovoltaic¹ (PV) Project** started development in 2009, when the American company Applied Energy Services (AES) had plans to build a PV power plant, then with an installed capacity of 80 MW. Development by AES stalled in 2009. Active work for the development of the Project (as currently structured and described below) started in 2020.

The current developer is Rezolv Energy (the “Company”) an independent clean energy power producer funded by Actis Eastern Europe Energy S.a.r.l. (<https://www.act.is/>). Rezolv Energy has set up a special project vehicle (the “Project Company”) R-Engineering EOOD as the entity responsible for the development of the St. George PV Project (Phase I and Phase II) (hereafter described as the “PV Project”). In addition, two 110 kV overhead line (OHTL) will be constructed by the Project to evacuate power to the national grid (“OHTL Project”), together the PV Project and the OHTL Project are considered the “Project”.

For development purposes the PV Project has been split into two “phases” or “PV power plants” to be built over relevant parts of the Project Site:

- (i) Phase 1 - PV power plant with a capacity of 99,5 MW_{AC} - “St. George East”
- (ii) Phase 2 - PV power plant with a capacity of 99,5 MW_{AC} - “St. George West”

The combined phases will have an overall installed capacity of approximately 229MWp.

The PV Project is located in northeast Bulgaria, on the land of the village of Polkovnik Lambrinovo, 5 km south of Silistra in the Silistra District. The Project is located on the site of a former airport including 2.5 km runway, a passenger terminal, adjacent infrastructure, and a former military airfield. The land was used by Silistra Airport, which was closed in 2000. The site is located on flat terrain with very minor undulation along the border. The site has good tarmac road and is connected to the Silistra town (approximately 12 km distant) via Route 208 and Route 21. The nearest major international airport and Port is in the City of Varna which is situated approximately 140km from the Project via Route 29, 71 and Route 207. The majority of the land around the site is agricultural. The nearest protected zone is BG 0000169 “Ludogorie Srebarna” at the site boundary. The PV Project coordinates are as follows:

- Latitude: 44.054837°
- Longitude: 27,183113°
- Altitude: 122 m.a.s.l

The PV Project consists of the following components which will be described in more detail in Section 2.0:

- PV Plant Phase I on land plots of 151,2765 ha

¹ Photovoltaics (PV) ¹ is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect. Photovoltaic power generation employs solar panels composed of a number of solar cells containing a photovoltaic material.

- V Plant Phase II on land plots of 104,51 ha
- Step-up Substation (SUS) - one substation with two step-up transformers
- Hub substation - located near the village of Smilets (HUB)²
- Low Voltage (LV) cables and LV/MV power stations and transformers.

The OHTL Project includes:

- 110 kV double circuit OHTL “Pelikan” connecting to existing 110 kV OHTL “Silistra to Tutrakan” via “loop in loop out” “LILO” connection.
- 110 kV double circuit OHTL “Dorostol” connecting to existing 110 kV OHTL “Silistra to Dorostol” via “LILO connection.

2. LAWS AND REGULATIONS

2.1.1. LAWS

A number of legislative acts/documents determine the order, conditions and requirements under which the various types of coordination regimes for investment intentions shall be carried out. Almost all types require some form of coordination with various government agencies. Among them is the Ministry of Internal Affairs and Communications and its regional divisions (RIOSV).

INTERNATIONAL LAW FOR THE CONSERVATION OF SPECIES AND HABITATS

All agreements and conventions signed by the Republic of Bulgaria determine the status of the species and the measures for their protection in an international context. The main texts and recommendations are integrated into the national legislation of the country.

CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE AND FAUNA AND NATURAL HABITATS (BERNE CONVENTION)

Appendix #2 - Strictly protected fauna species. All species of bats except *Pipistrellus pipistrellus*

Appendix #3 - Migratory species *Pipistrellus pipistrellus*

CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (BONN CONVENTION)

The Parties shall in particular:

(a) encourage, cooperate and support research related to migratory species;

b) make efforts to ensure the immediate protection of migratory species included in Appendix No. 1;

² Developed by the Electricity System Operator (ESO)

(c) seek to conclude agreements for the conservation and management of migratory species included in Appendix No. 2. All European bat species are included in Appendix No. 2. *AGREEMENT FOR THE CONSERVATION OF POPULATIONS OF EUROPEAN BATS EUROBATS – <http://www.eurobats.org>*

In force for the Republic of Bulgaria from 9.12.1999 (SG 16/2000). As for migratory animals, the Agreement is based on the Bonn Convention and states that each party shall adopt and implement such legislative and administrative measures as are necessary to maintain a favorable conservation status of all species by preventing the deliberate capture, confinement or killing of bats, identify and protect sites important for their breeding and hibernation, promote research programs related to bat conservation and management, consider the potential effect of pesticides on bats, and take further action to save bat populations that it has identified as at risk of threat.

The main obligations under this agreement are:

1. Each Party shall prohibit the deliberate capture, confinement or killing of bats, unless authorized by its competent authority.

2. Each Party shall identify those places within its sphere of jurisdiction that are important for conservation status, including the protection of bats. Considering economic and social conditions as a necessity, it protects these places from disturbance or destruction. In addition, each country shall make efforts to identify and protect from damage and destruction important foraging areas for bats.

3. In deciding which habitats to protect in terms of general conservation objectives, each country shall assess the importance of habitats important to bats.

4. Each Party shall take appropriate measures to promote the conservation of bats and to raise public awareness of the importance of their conservation.

5. Each Party shall assign to an appropriate authority the responsibility for providing advice on matters affecting the conservation and management of bats in its territory, particularly with regard to bats inhabiting buildings. The Parties shall exchange information on their experiences in this regard.

6. Each country shall take additional actions, as it considers necessary, to save the populations of bats that it has determined to be under threat, and shall report on the actions taken, in accordance with Art. VI. 7. Each Party shall, where appropriate, promote research programs related to the conservation and management of bats. The Parties shall consult with each other regarding such research programs and shall endeavor to coordinate research and conservation programs.

7. Each Party shall, where appropriate, consider the potential effect of the Provisions of this Agreement shall in no way affect the right of the Parties to take more stringent measures

regarding the conservation of bats. 19 pesticides on bats when evaluating pesticides for use and is making efforts to replace wood treatments that are highly toxic to bats with safer counterparts.

DIRECTIVE 92/43/EEC ON THE CONSERVATION OF NATURAL HABITATS AND OF WILD FLORA AND FAUNA (HABITATS DIRECTIVE)

The main objective of the Directive is "to ensure the continued existence or possible restoration to a favorable conservation status of these types of natural habitats of the species in their natural range".

Appendix 2 includes 13 species of bats: *Rhinolophus blasii*, *Rh. euryale*, *Rh. ferrumequinum*, *Rh. hipposideros*, *Rh. mehelyi*, *Barbastella barbastellus*, *Miniopterus schreibersii*, *Myotis bechsteinii*, *M. blythii*, *M. capaccinii*, *M. dasyncneme*, *M. emarginatus* and *M. myotis*. It is the duty of the EU member states to guarantee the appropriate protection of these species and their habitats, especially in the places of the ecological network NATURA 2000. In the presence of any of these species, the assessments of the status of their populations in the considered territory must be particularly comprehensive. For all species from Appendix 2, standard forms have been developed with specific criteria that can be used to assess whether the species are in a favorable conservation status. Achieving this status is the main goal of the Directive with all the resulting obligations of our country to ensure adequate protection and restoration of their refuges and food habitats.

NATIONAL LEGISLATION REGARDING THE PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT AND COMPATIBILITY ASSESSMENT

The following regulations are applicable:

- Environmental protection law - zoo
- The regulation on the conditions and procedure for performing an environmental impact assessment
- Regulation on the conditions and procedure for carrying out a compatibility assessment
- Law on biological diversity (promulgated sg no. 77/9.08.2002 with all subsequent amendments and additions)the law regulates the relations between the state, municipalities, legal entities and individuals in the protection and sustainable use of biological diversity in the republic of bulgaria. According to this law, all types of bats in our country are strictly protected throughout the country

3. FLORA

3.1. Overview

The studied region falls into the Eurasian steppe and forest-steppe region, Lower Danube Province, Dobrudja District (according to the geobotanical zoning of Bulgaria). The vegetation in the area is represented by poorly preserved natural forests. In the southern part of the municipality there are relatively dry broad-leaved oak forests, in the north the forest vegetation changes to steppe and forest-steppe. Along the Danube River, Srebarna Lake, the Danube Islands and the Aydemir Plain, the moisture-rich alluvial soils cause the spread of moisture-loving grass and forest species.

3.2. Methods for monitoring vascular plants

3.2.1. Field work

The field surveys were conducted during the period April-September 2023. The descriptions of the vegetation followed the methodical approach of Braun-Blanquet (Braun-Blanquet 1965, Westhoff & van der Maarel 1973) and were made in homogeneous and representative sections of the plant communities. The size of the trial plots is standardized and follows widely accepted standards in phytocenology (Chytrý & Otypková 2003, van der Maarel 2005). According to Dengler et al. (2009) the size of each plot should be the "minimum area for plant community emergence", i.e. the smallest territory in which all the species distributed in it occur or at least 90% of them.

After laying the site, it is marked in the four corners. Additionally, species that occur near the test sites, but do not fall into them, are also noted. The determination of the higher plants (without the mosses) follows Delipavlov & Cheshmedzhiev (2003), but separate references were also made to the volumes of Flora of Bulgaria I-XI (Yordanov 1963-1979, Velchev 1982, 1989, Kozhuharov 1995, Kozhuharov & Anchev 2012). Habitats from Directive 92/43 of the EEC (1992) are defined in accordance with the Interpretation Manual of European Habitats (2007) and Kavrková et al. (2009). Natural habitats have also been assessed according to the Red Book of the Republic of Bulgaria (Biserkov et al. 2015).

3.2.2. Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. An analysis of the collected data on the presence/absence of the indicator species is performed.

3.2.3. Necessary technical equipment

The following aids and materials are required for effective field work:

Mandatory:

- GPS device;
- Determinant to identify higher plants;
- Camera for recording the species and the location;

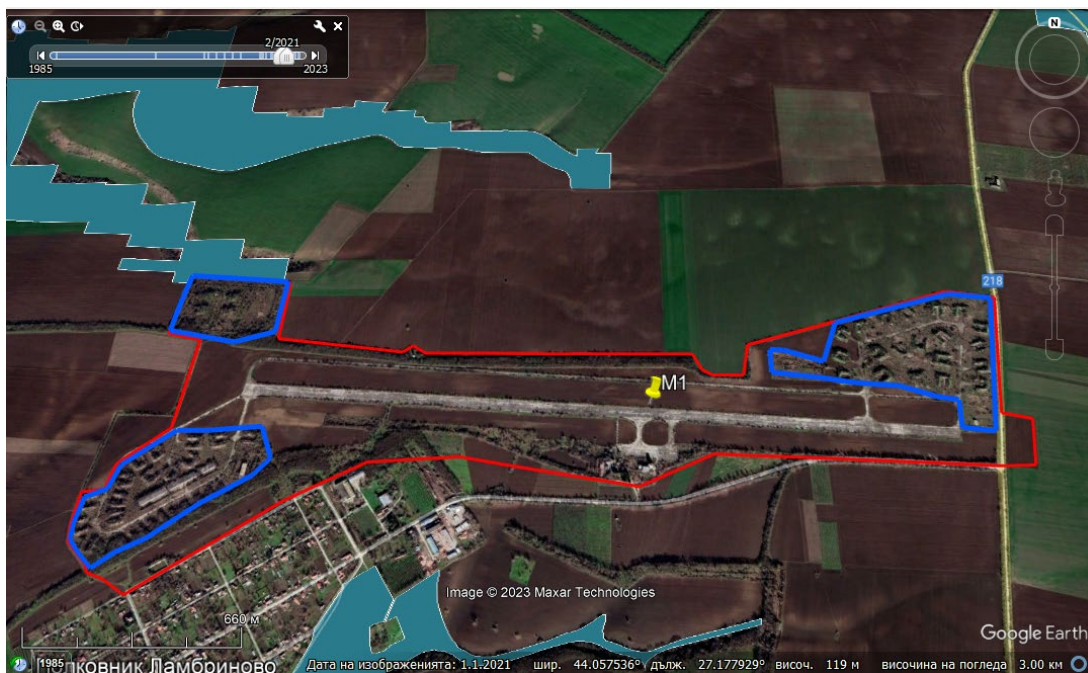
In the forest-steppe and steppe part located between the areas with oak and riparian forests, the formations with the dominance of steppe grass species grow.

The vegetation in the area (within a radius of about 5-10 km around the future site for the FPP) is represented by residual xerothermic low-stemmed oak forests, as well as by secondary communities of the hornbeam. Usually, these are mixed forests of cer (*Quercus*

cerris), white oak (*Quercus frainetto*) and hornbeam (*Carpinus orientalis*'), and depending on the specific conditions, one or the other oak prevails. The hornbeam, with more abundant development, can form a second floor (undergrowth), which is of a very fragmentary character. In the shrub communities there is also the dogwood (*Paliurus spina-christi*) with the participation of hawthorn (*Crataegus monogina*), rosehip (*Rosa canina*), field blackberry (*Rubus caesius*).

Grass vegetation on the dry slopes it is composed of communities of sedina (*Chrysopogon gryllus*), bulbous meadow (*Poa bulbosa*) and bellisma (*Dichanthium ischaemum*), with an increased presence of annual grasses. The mesophytic communities of the meadow fescue (*Festuca pratensis*'), the rosary meadow (*Poa sylvicola*), vole species (*Agrostis stolonifera*, *A. capillaris*) and others are characteristic in the moist meadows.

The site of the investment proposal falls within the territory of the former airport near the village of Lambrinovo.



The grass cover on the properties consists of a small number of calciphilous and ruderal species. Loose communities of annual and perennial herbaceous species are observed on the nutrient poor. Clusters with low coverage of: *Galium aparinae* are observed; *Cynodon dactylon*; *Arabis turrata*; *Lotus corniculatus*; *Echium vulgare*; *Chrysopogon gryllus*; *Filipendula vulgaris*; *Senecio vernalis*; *Teucrium chamaedrys*; *Sanguisorba minor*; *Eryngium campestre*; *Festuca valesiaca*; *Taraxacum officinale*; *Galium verum*; *Poa angustifolia*; *Achillea millefolium*; *Artemisia austriaca*; *Xeranthemum annuum* etc.

Areas occupied by grassy areas, represented mainly by ruderal types of plants - these are areas that were used for specialized equipment for servicing the airport and the storage of a squadron of Russian-made MIG aircraft, the so-called in Bulgarian - "buksi".



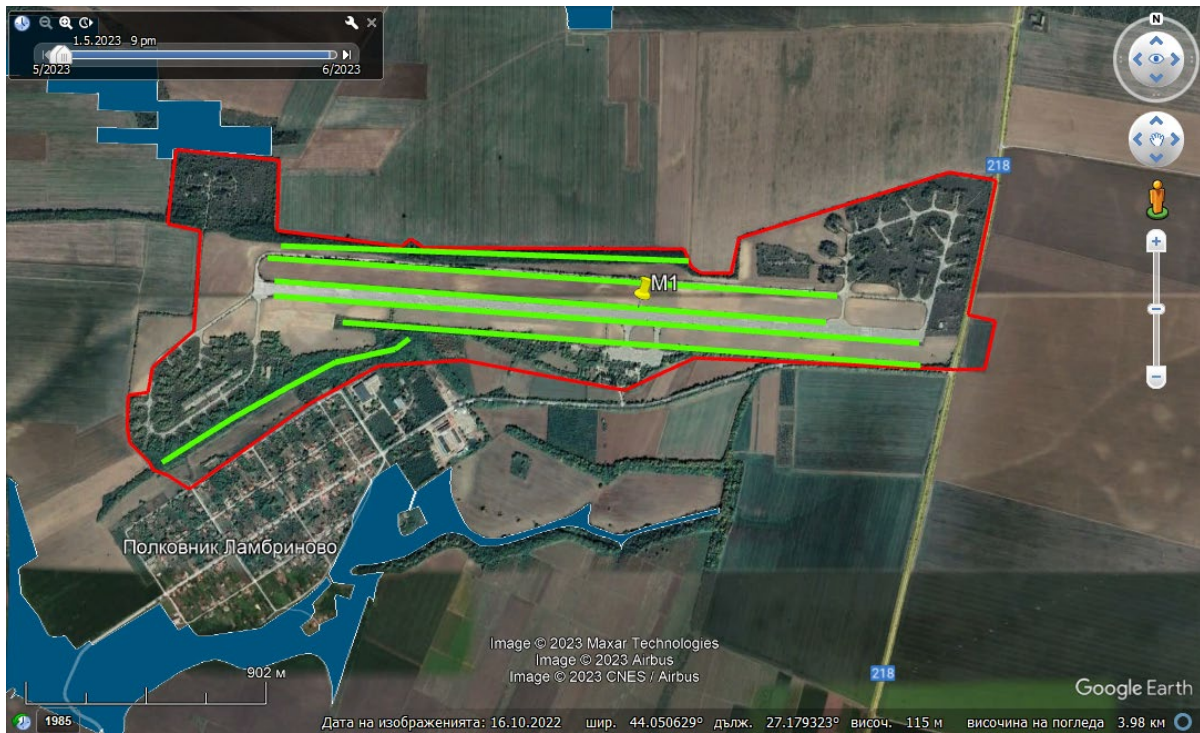
Areas occupied by grassy areas represented mainly by ruderal plant species (Google Earth Pro 7.3.6.9345 (64-bit) image is as of February 2021)

Photo from field surveys as of March 2023 in grassy areas, represented mainly by ruderal plant species, the so-called in Bulgarian - "buksi"



Photo from field surveys as of May 2023 in grassy areas, represented mainly by ruderal plant species, the so-called in Bulgarian - "buksi"

Within the boundaries of the areas planned for the construction of the Photovoltaic Project(PP), successional processes are observed, which have led to changes in the agrarian landscape, and these areas are grassed or covered with trees (forested mainly acacia - 90% and self-settled species, such as: walnut, elm, plum , gorse, hawthorn and others) and shrubs (blackberry, rose hip).



Areas occupied by grass or covered with trees (forested mainly acacia - 90% and self-settled species, such as: walnut, elm, plum, gorse, hawthorn and others) and shrubs (blackberry, rosehip) (the image in Google Earth Pro 7.3.6.9345 (64-bit) is as of February 2021).



Figure 1: Tree and shrub vegetation around the track – March monitoring 2023.



Figure 2: Tree and shrub vegetation around the track – April monitoring 2023



Figure 3: Missing tree and shrub vegetation around the track – May 2023.



Beginning of felling of tree and shrub vegetation along the northern and southern borders of the airport – March-April monitoring 2023.





Final removal of tree and shrub vegetation along northern and southern airport boundaries, buffer strips and self-established vegetation around the airport runway – May 2023 monitoring.

In June 2023, the company performing cleaning and preparation of the territory for the installation works of the installations, routes and photo panels carried out a complete removal of the grass vegetation from the prepared areas, and this caused a complete change of the microhabitats that exist despite human intervened in the territory.



4. AMPHIBIANS AND INVERTEBRATES

4.1. Invertebrates

4.1.1. Faunal diversity of Bulgaria

The biological diversity of a country or geographical region depends on many factors, the main of which are the geographical location, relief, climatic features, the presence of natural features (rock composition, soil cover, water sources and reservoirs), the anthropogenic impact on the natural environment, etc. . The combination of these factors determines to the greatest extent the wealth of biological species (microorganisms, fungi, plants and animals), which are the main components of the biological diversity of the respective territory, regardless of its area.

Bulgaria is one of the small European countries in terms of territory, but in terms of richness and diversity of its fauna it is in one of the first places in Europe. Its geographical position in the southeastern part of the continent, the complex paleogeographical and paleoclimatic past, the diverse relief and climate, the availability of sufficient fresh water resources and the proximity to the Black Sea, the significant forest fund, etc. are basic and important factors favoring the existence of a rich and original faunal diversity. In the southern regions of the country and along the Black Sea coast, heat-loving and dry-loving Mediterranean species of animals are found, and in the northern and mountainous regions many species characteristic of Central and Northern Europe and the Ukrainian steppes coexist. The number of animals that are found only in Bulgaria or the Balkan Peninsula is also large. They belong to the categories of Bulgarian and Balkan endemics. In many of the Bulgarian caves and in the southern mountains, a large number of species of animals from before and from the time of the glaciation of Europe, which we refer today to the category of relics, have found refuge and preserved. These living fossils, which have survived from past geological epochs in our country, best reveal to modern zoologists the ways of formation and evolution of the Bulgarian fauna. Bulgaria is characterized by a rich and unique cave fauna with many endemics. Compared to Central and Western Europe, however, the country is still insufficiently studied in terms of fauna, and Bulgarian zoologists and ecologists still have a lot of work to do for a complete and comprehensive study of our rich and unique faunal diversity.

Table 1: Faunal diversity of invertebrates in Bulgaria

Type*	Classes (no.)	Order (no.)	Species (бр.)	Authors
Sarcomastigophora	8	28	~ 580	Големански <i>и др.</i> (2005)
Labyrinthomorpha	1	1	3	Големански <i>и др.</i> (2005)
Sporozoa	1	5	~ 270	Големански <i>и др.</i> (2005)
Microspora	2	4	27	Големански <i>и др.</i> (2005)
Ascetospora	1	1	2	Големански <i>и др.</i> (2005)
Myxozoa	1	1	47	Големански <i>и др.</i> (2005)
Ciliophora (Infusoria)	3	19	~ 680	Големански <i>и др.</i> (2005)
Spongia (Porifera)	1	3	29	Големански <i>и др.</i> (2005)
Cnidaria	3	5	32	Големански <i>и др.</i> (2005)
Ctenophora	2	3	3	Големански <i>и др.</i> (2005)
Platyhelminthes	4	21	~ 830	Големански <i>и др.</i> (2005)
Gastrotricha	1	2	40	Хубенов (1996)

Type*	Classes (no.)	Order (no.)	Species (бр.)	Authors
Nematoda	2	14	~ 970	Големански <i>и др.</i> (2005)
Rotifera (Rotatoria)	3	4	~ 290	Големански <i>и др.</i> (2005)
Nematomorpha	1	1	8	Хубенов (1996)
Acanthocephala	3	6	52	Големански <i>и др.</i> (2005)
Kinorhyncha	1	2	4	Големански <i>и др.</i> (2005)
Entoprocta (Kamptozoa)	1	1	2	Хубенов (1996)
Annelida	5	15	~ 240	Големански <i>и др.</i> (2005)
Ectoprocta (Bryozoa)	2	3	25	Хубенов (1996)
Phoronida	1	1	1	Хубенов (1996)
Nemertea	1	2	26	Маринов, Големански (1989)
Tardigrada	2	4	34	Иларос (1961), Хубенов (1996)
Arthropoda	9	62	~ 24 720	Големански <i>и др.</i> (2005), Делчев <i>и др.</i> (2005), Берон (2005), Хубенов (1996, 2005a)
Mollusca	3	18	445	Хубенов (2005b)
Echinodermata	1	2	4	Маринов, Големански (1989)
Chaetognatha	1	1	3	Маринов, Големански (1989)
Hemichordata	1	1	1	Хубенов (1996)
Общо	65	230	~ 30 000	

* Ву Големански, Шишиньова (2001)

In terms of zoogeography, the terrestrial fauna of Bulgaria refers to the Palaearctic zoogeographic region of the Holarctic Kingdom. Due to the fact that Bulgaria is located mainly in the Euro-Siberian zoogeographic sub-region, but also borders the Mediterranean zoogeographic sub-region, two main zoo-geographic complexes are found in the country: northern (Euro-Siberian), formed by cold-resistant species of animals, and southern (Mediterranean), including many heat-loving species (Josifov 1988).

Of the northern complex, the most widespread are Holarctic species that live in the Northern Hemisphere, both in Europe and Asia, and in North America. Holarctic species in the Bulgarian fauna are the bear, the fox, the weasel, the red deer, the golden eagle, the barn owl, etc. Palearctic animal species are widely represented in the country, which also live north of the tropics, but only in Europe, Asia and North Africa. Such are the otter, the white stork, the field lark, the great tit, the large (brown) toad, etc. Euro-Siberian animal species are the most numerous. They are more cold-resistant and have penetrated the Bulgarian lands from North Asia and Europe, and for many of them Bulgaria is the southern border of distribution. This zoogeographical category includes the squirrel, wood vole, badger, roe deer, grouse, partridge, meadow lizard, etc. Central European faunal elements have similar ecological requirements to the Eurosiberian fauna. Such representatives in our country are the little water vole, the subterranean vole, the alpine newt, the red-bellied buzzard, etc. From the northern zoogeographical complex in Bulgaria, steppe species (luluger, jumping mouse, degree ferret, woodpecker), arctoalpine species (white-throated thrush) and boreomontane species (live-born lizard, viper) are found in Bulgaria, although more limited.

Invertebrate animals in Northeastern Bulgaria number over 1000 species, which belong to 3 types, 6 classes, 22 orders and 120 families. Depending on the level of research, the established taxa make up a different share of the fauna of the respective group in Bulgaria. So far, 37 species of molluscs belonging to 11 families and 3 orders of the subclasses Prosobranchia (protobranch snails) and Pulmonata (pulmonary snails) are known from the area. Terrestrial forms predominate among them. The families Clausiliidae and Zonitidae are represented with the most species, followed by Helicidae and Hygromiidae. For the assessment of insect diversity, 9 orders with medium and low species richness and 3 orders with high species richness were considered. The orders Blattaria (cockroaches), Mantodea (mantises), Orthoptera (straight-winged insects in the narrow sense) and Dermaptera (weevils) are united in the group Orthopterida (straight-winged insects in the broad sense). The group Neuropterida (net-winged insects in the broad sense) is represented by the order Neuroptera (actual net-winged insects). About 150 species of the stilloptera are included, but due to the lack of precisely located ones, it is difficult to assess the real species diversity in the area. Part of the life cycle of Odonata (dragonflies), Trichoptera (waterflies), some Coleoptera (hardwings) and Diptera (diptera) takes place in an aquatic environment. 133 species of Diptera belonging to 11 families were examined. The families Limoniidae and Tachinidae are represented with more species. The entomofauna includes about 3.3% of the Bulgarian Diptera - too little for the order as a whole. The dipteran fauna has not been studied and it is assumed that less than 15% of the possible species have been established.

Given the established habitats according to EUNIS (Davies et al. 2004) and the surrounding predominantly arable land (growing mainly cereals and fruit tree species), the presence of species of conservation importance is not expected.

The presence of species exclusively related to agroecosystems is assumed.

4.2. Amphibians and reptiles

Bulgaria is inhabited by 20 species of amphibians and 35 species of reptiles, the majority of which are represented by stable populations, thus ranking among the richest European countries in terms of herpetological fauna. Many of the species found here can only be seen in this part of the continent.

4.2.1. List of the Bulgarian herpetofauna

1. Fire salamander (*Salamandra salamandra*)
2. Alpine newt (*Mesotriton alpestris*)
3. Smooth newt (*Lissotriton vulgaris*)
4. Southern crested newt (*Triturus karelinii*)
5. Northern crested newt (*Triturus cristatus*)
6. Danube crested newt (*Triturus dobrogicus*)
7. Balkan crested newt (*Triturus ivanbureschi*)
8. European fire-bellied toad (*Bombina bombina*)
9. Yellow-bellied toad (*Bombina variegata*)
10. Common spadefoot toad (*Pelobates fuscus*)
11. Syrian Spadefoot (*Pelobates syriacus*)
12. Common toad (*Bufo bufo*)
13. European green toad (*Bufo viridis*)
14. European tree frog (*Hyla arborea*)
15. Greek stream frog (*Rana graeca*)
16. Agile frog (*Rana dalmatina*)
17. Common frog (*Rana temporaria*)
18. Marsh frog (*Pelophylax ridibundus*)

19. Edible frog (*Pelophylax esculentus*)
20. Pool frog (*Pelophylax lessonae*)
21. Greek tortoise (*Testudo graeca*)
22. Hermann's tortoise (*Testudo hermanni*)
23. Balkan terrapin (*Mauremys rivulata*)
24. European pond turtle (*Emys orbicularis*)
25. Pond slider (*Trachemys scripta*) – non-native species
26. Kotschy's gecko (*Mediodactylus kotschyi*)
27. Mediterranean house gecko (*Hemidactylus turcicus*)
28. European copper skink (*Ablepharus kitaibelii*)
29. European glass lizard (*Pseudopus apodus*)
30. Slow worm (*Anguis fragilis*)
31. European green lizard (*Lacerta viridis*)
32. Balkan green lizard (*Lacerta trilineata*)
33. Sand lizard (*Lacerta agilis*)
34. Meadow lizard (*Darevskia praticola*)
35. Snake-eyed Lizard (*Ophisops elegans*)
36. Erhard's wall lizard (*Podarcis erhardii*)
37. Common wall lizard (*Podarcis muralis*)
38. Balkan Wall Lizard (*Podarcis tauricus*)
39. Common lizard (*Zootoca vivipara*)
40. European blind snake (*Typhlops vermicularis*)
41. Sand Boa (*Eryx jaculus*)
42. Caspian whipsnake (*Dolichophis caspius*)
43. Dahl's whip snake (*Platyceps caspius*)

44. Red whip snake (*Platyceps collaris*)
45. European ratsnake (*Zamenis situla*)
46. Aesculapian snake (*Zamenis longissimus*)
47. Four-lined snake (*Elaphe quatuorlineata*)
48. Blotched snake (*Elaphe sauromates*)
49. Smooth snake (*Coronella austriaca*)
50. Grass snake (*Natrix natrix*)
51. Dice snake (*Natrix tessellata*)
52. Eastern Montpellier snake (*Malpolon insignitus*)
53. European cat snake (*Telescopus fallax*)
54. Horned Viper (*Vipera ammodytes*)
55. Common European viper (*Vipera berus*)

According to field inspections, no habitats have been established that represent temporary or permanent sources of fresh water or that similar ones are available within a radius of about 1000 meters. This in turn excludes the presence of species associated with this type of habitat.

5. MAMMALS (EXCEPT BATS)

5.1. General characteristics of the class Mammalia

Mammals are the highest group of animals in evolutionary terms. Most modern mammals belong to the subclass Theria and are distinguished by the following features. Their brain is large, with a well-differentiated neopallium (a layer of gray brain matter) that provides a high level of neural activity and behavioral manifestations. They give birth to their young, which they then feed on milk. This ensures high survival of the offspring in the early and more vulnerable periods of ontogeny. They have a relatively high and constant body temperature (homothermic). Their body is covered with skin, which has a complex structure and performs a variety of functions (protection from mechanical damage, protection from the penetration of microorganisms, participation in thermoregulation and metabolism, storage of nutrients, implementation of chemical signaling, sensory functions, production of milk, etc.). In most cases, their skin is covered with bones, with the exception of some groups in which their absence is a secondary phenomenon — eg, cetaceans, hippopotamuses, rhinoceroses, etc. Their heart is four-chambered with complete separation of arterial from venous blood. Their lower jaw is represented by only one bone (dentale), which is

connected to the skull by means of a special articular growth (condylus mandibulare), entering the pit on the underside of the squamosum; the rest of the bones characteristic of reptiles have disappeared or become part of the auditory apparatus of the middle ear. Their skull is connected to the spine by two condyles. Their teeth are located in alveoli and are differentiated into incisors, canines, premolars and molars.

The list includes mammals, local and introduced, found in the wild on the territory of Bulgaria. They number over 100 (according to other reports 95) species, divided into 7 orders, 24 families and 52 (56) genera. During historical times, the lion, tur, bison, beaver, lynx, fallow deer, bezoar ibex, saiga, European mink, ermine, etc. disappeared from the fauna of the country.

5.1.1. Sizes and morphological types of mammals

The sizes of mammals are too different. The smallest species is the ground Etruscan whitetooth {*Suncus etruscus* (Savi, 1822), whose length does not exceed 48 mm, and its mass is 1.25 - 2.34 g. The largest size is the blue whale (*Balaenoptera musculus* (Linnaeus, 1757), 30 — 33 m long and weighing up to 150 t. The morphological adaptations of mammals can be grouped into several types. Aquatic mammals. Due to the greater resistance of water, the body of these animals has a streamlined shape, and their movement takes place through a highly developed muscular organ — fin(s). Depending on the degree of specialization, two groups are distinguished: obligately aquatic (eg, whales, dolphins, etc.) and amphibians (eg, seals, some insectivores, rodents, carnivores, etc.). Terrestrial mammals. Show considerable diversity related to their different directions of adaptation. On the basis of the mode of locomotion, two groups cannot be distinguished - quadrupedal (quadripedal) and walking on two legs (bipedal). Within the first group there are running (e.g. ungulates), jumping (e.g. rabbits, some rodents). Running mammals are characterized by highly elongated limbs and an evolutionary tendency to reduce the number on the fingers - from five to two or one. As the speed of movement increases, the way of stepping also changes — from stepping on the whole foot (plantigrade) to stepping on the toes (digitigrade mammals). Jumping mammals are characteristic of open habitats - steppes, savannas, deserts. In them, the hind legs are better developed than the front ones; often occupy a semi-erect position. Arboreal mammals. The main adaptations to this way of life are also best shown in the structure of the limbs and some body appendages. Their nails are well developed. The fingers, wrist, and sometimes the tail perform a grasping function. Often the tail also plays a role in maintaining balance. Flying mammals. Some mammals have passive flight — gliding. However, most flying mammals (bats) have evolved active flight. In them, the front limbs are modified into wings. A highly developed skin fold (flight membrane) is stretched over the elongated bones of the wrist. Subterranean (burrowing) mammals. They are adapted to life in the soil, moving by burrowing a complex system of moves. The specialization to this way of life is accompanied by a strong development of the organs used for burrowing — front limbs (eg, mole), incisors (eg, the blind dog), with a reduction of eyes and ear shells.

5.1.2. Zoogeographical structure of modern fauna

A zoogeographic categorization of mammals in our country was made by several researchers (Zimina, 1962; Markov, 1970; Markov, Hristov, 1974; Mitev, 1979 b). These classifications are based on the modern distribution of the species and are descriptive in nature. In

this work, a more analytical approach is used, based on the concept of a faunal complex (U d V a r d u, 1969) — a group of species with a common geographical origin, similar ecological requirements and, as a result — similar distribution dynamics in the geological past and similarity in modern areas. Based on the available paleontological data, ecological preferences and modern distribution, the following zoogeographical classification can be proposed, applicable to Quaternary mammals in our country (Popov, Delchev, 1997):

I. Tundra (Arctic) type of fauna (not represented in the modern fauna of Bulgaria)

II. Forest mesophilic type of fauna

1. Boreal fauna complex

2. Immoral faunistic complex

III. Forest thermoxerophilic type of fauna

1. Mediterranean fauna complex

IV. Continental-xerophilic type of fauna

1. Step fauna complex

2. Desert faunal complex (not represented in the modern fauna To Bulgaria).

5.1.3. Forest mesophilic fauna type

Several groups of species can be distinguished in it. Widespread species. These are a group of species with a wide distribution in the forests of the temperate zone of the Palearctic and/or Holarctic. In Bulgarian fauna, they are represented by fox (*Vulpes vulpes*), wolf (*Canis lupus*), weasel (*Mustela nivalis*), bear (*Ursus arctos*), red deer (*Cervus elaphus*), wild boar (*Sus scrofa*), otter (*Lutra lutra*), badger (*Meles meles*) and others. They inhabit various biotopes all over the country, with the exception of the wolf, whose numbers are under anthropogenic pressure, and the bear, whose distribution is limited by man. The fauna of the area and the territory planned for the construction of the FEC belongs to the Forest mesophilic type of fauna with some steppe elements.

The biotopes that are potential places for living and reproduction, as well as temporary places for searching for food and passing through, have been determined. Maps of characteristic habitats of mammal species from the project area (except bats) are provided below.

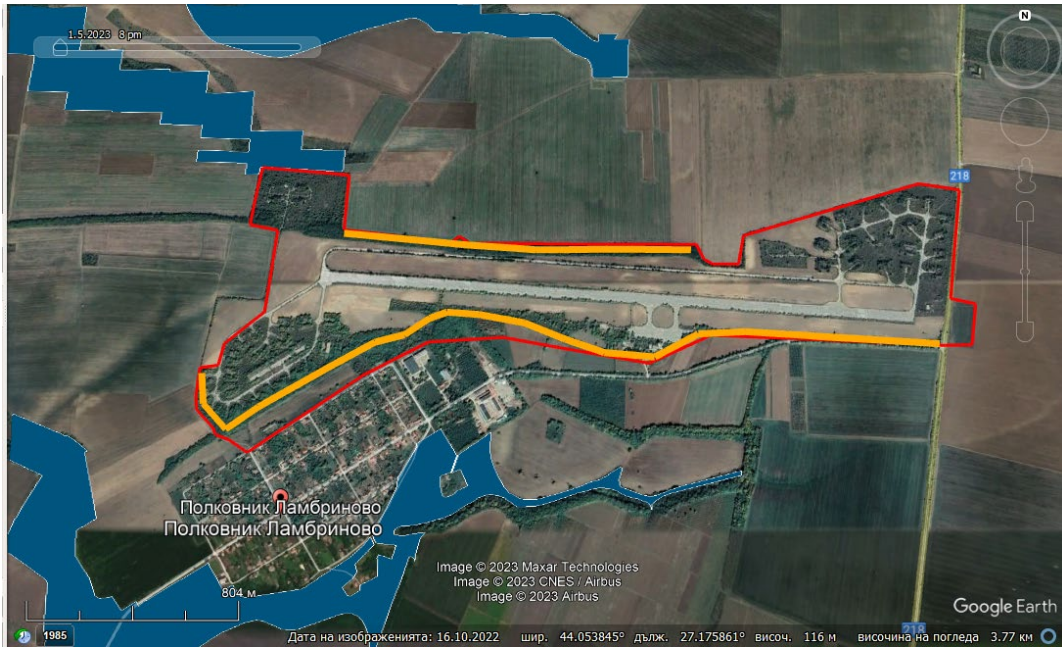


Figure 4: Arable fields and asphalt roads (airport runways)

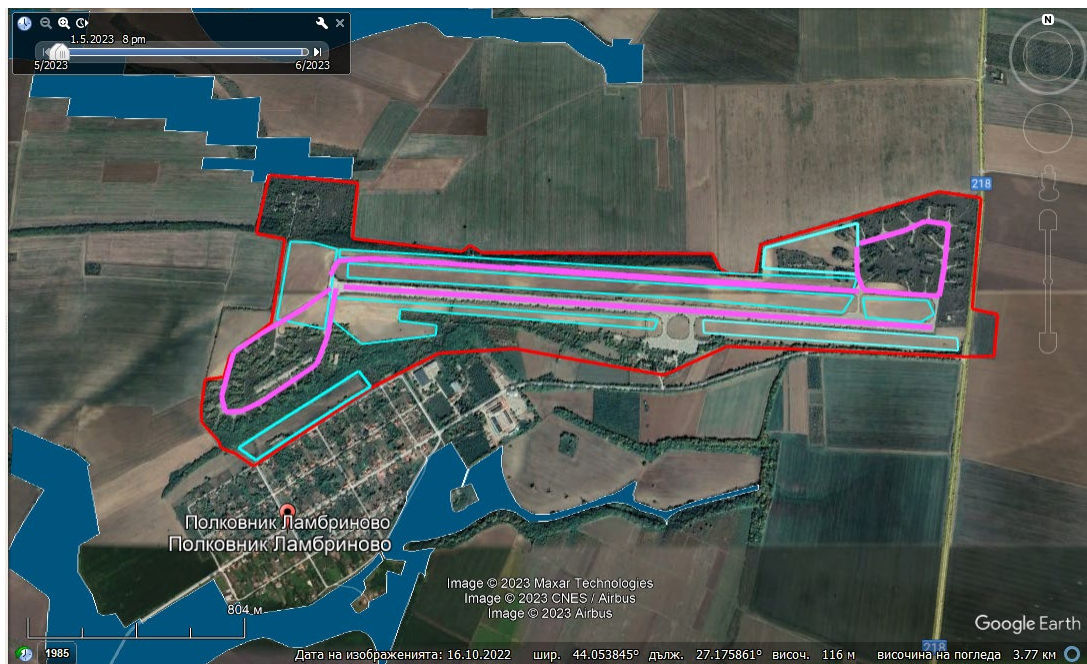


Figure 5: Strips of trees in a north and south direction from the boundary of the property

6. BASELINE ASSESSMENT METHODOLOGY

6.1. Invertebrates

6.1.1. Methodology for monitoring of Diurnal butterflies – Lepidoptera (D)

Field work

Of essential importance in the selection of the sample units and the time for conducting the monitoring are the knowledge of the following main characteristics of the individual species - (1) the known distribution of the species on the territory of the country, (2) the species-specific preferences for a certain type of habitat and (3) phenology - the flight period of the imago, and data on the biology of the species, including the food plant of the larvae, are also useful (see II. Description of the sites). Model maps of the monitoring areas are used in the field, showing the potential habitats for the respective species. The species of the group are diurnal and heliophilous. The establishment of individuals in the field is directly related to favorable weather conditions - cloudless, without strong wind. Recommended working hours are between 10am and 6pm. The research uses a simplified version of pollard's transect count (Pollard, E. 1977. A method for assessing changes in the abundance of butterflies. - Biological Conservation, 12: 115-134). In a modified version, butterflies are counted as they move along this transect, with the researcher counting individuals in front of him at a distance of width, length and height of 5 m. The number of transects in one monitoring territory is a minimum of 1. Butterflies are observed or caught with an entomological net. Catching is done by swinging or trapping the butterfly, and it must fall through the hoop into the net. After the butterfly is caught, it is sealed in a small jar until it calms down and carefully examined to identify it. In case of doubt about the exact identification. During the transect, observations are also made for traces of negative human activities and their impact on the respective habitats. All characteristic moments during the study, such as the general view of the habitats, the identification of the studied species and detected damages from human activity, are captured with a digital camera.

Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. An analysis of the collected data on the presence/absence of the indicator species is performed.

Necessary technical equipment

The necessary technical equipment covers:

1. suitable personal equipment for field work;
2. a small backpack;
3. entomological bag;
4. a small "stain" type jar;
5. tweezers;

6. GPS device with maps and software;
7. digital camera for documenting the presence of the species and type of habitats;
8. specifier, eg Tolman T. 1997. Butterflies of Britain and Europe. - HarperCollins Publishers, London, 320 pp.

6.1.2. Monitoring methodology nocturnal butterflies – Lepidoptera (N)

Field work

Of essential importance in the selection of the sample units and the time for conducting the monitoring are the knowledge of the following main characteristic features of the individual species - (1) the known distribution of the species on the territory of the country, (2) the species-specific preferences for a certain type of habitat and (3) phenology - the flight period of the imago, and data on the biology of the species, including the food plant of the larvae, are also useful (see II. Description of the sites). Model maps of the monitoring areas are used in the field, showing the potential habitats for the respective species. The species of the group are nocturnal. The establishment of individuals in the field is directly related to favorable weather conditions - moonless nights, without strong wind and heavy rainfall.

A determiner is used by a layman. In case of doubt about the exact identification, the butterfly is photographed, aiming to photograph the upper and lower sides of the wings. During the research, observations are also made for traces of negative human activities and their impact on the respective habitats.

Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. A preliminary analysis of the received data on the presence/absence of the indicator species is performed.

Necessary technical equipment

The necessary technical equipment covers:

1. suitable personal equipment for field work;
2. a small backpack;
3. tweezers;
4. GPS device with maps and software;
5. digital camera for documenting the presence of the species and type of habitats;
6. determiners, eg Koch M. 1988. Wir bestimmen Schmetterlinge. - HarperCollins Publishers, London, 320 pp. and Rougeot, P.-C., P. Viette 1978. Guide des Papillons

Nocturnes d'Europe et d'Afrique du Nord. - Delachaux & Niestlé, Neuchâtel - Paris, 228 pp.

6.1.3. Monitoring methodology - family Carabidae

Field work

Adult specimens are caught in a predetermined monitoring area for each of the species. Within the boundaries of this territory, the team defines the sample area within which the collection of data for the species is carried out by catching specimens of the respective species. Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. A preliminary analysis of the received data on the presence/absence of the indicator species is performed.

Necessary technical equipment

- Markers;
- laboratory tweezers (with a length of at least 20 cm)
- latex gloves;
- headlamp or lantern.

6.1.4. Monitoring methodology - order Coleoptera (large representatives)

Field work

Each transect is carried out by two people. All flying and ground-moving specimens are counted. Data were read every 100 m, The scheme is repeated until the end of the transect or until one hour has passed since its beginning.

Stationary work

unnecessary

Necessary technical equipment

- GPS device;
- pencil with/and eraser;
- lantern or headlamp;
- thermo-hydro-anemometer;
- data loggers;

6.1.5. Methodology for monitoring - order Mantodea

Field work

Available monitoring data for Orthoptera and Mantodea refer to area-specific communities and/or transect species complexes (see e.g. Riede 1998; Penone et al. 2013) or do not concern specific species, therefore do not provide information on the monitoring of the species under consideration. The research uses a transect method. The transect takes place during the day.

The recording of individuals of *E. fasciata* is mainly done by mowing in the herbaceous vegetation with an entomological bag, as the latter usually adhere to the herbaceous plants. Additionally, the vegetation is monitored for registration of individuals. For each transect, a total number of registered individuals is reported. During the transect, observations are made for traces of negative human activities and their impact on the respective habitats, for the condition of the habitat, as well as for the conditions of conducting the transect, which may lead, for example, to low activity of the individuals.

Stationary work

unnecessary

Necessary technical equipment

The necessary technical equipment covers:

1. GPS device;
2. portable computer (for each team);
3. work clothes (sturdy shoes, trousers, jacket) (for each field expert);
4. a small backpack (for each field expert);
5. camera (for each field expert);
6. headlamp (for each field expert);
7. entomological bag;
8. maps;
9. battery.

6.1.6. Monitoring methodology - species of the order Odonata

Field work

Model maps are used in the field, on which the potential habitats for the respective species are drawn. The research uses the transect method, i.e. the sample unit is a sample transect. Requirements for selecting the transects: • Select easily accessible and well-lit (sunny in spring and summer) sections along the coast where the habitat type is relatively uniform • The selected transects must be walkable on the same route each year • If possible, the transect to closely follow the boundaries of the water basin • monitoring should be carried out when the dragonflies are active, according to the following rules: - in sunny weather - cloud cover below 60%; - at an air temperature (in the shade) above 15 C; - in comparative. calm weather (light to moderate wind) – up to 4 on the Beaufort scale (up to 29 km/h or 7.9 m/s). monitoring is NOT carried out if: - the air temperature is below 15°C or above 32°C in the shade; - the weather is cloudy -

cloud cover over 60%; - strong wind – over 4 on the Beaufort scale (over 29 km/h or 7.9 m/s; when the wind shakes small trees); - in rainy weather. The number of transects varies from 1 to 3 depending on the size of the studied territory. At each reading, at least 1-3 specimens of the indicator species are captured to verify its identity. This is done using a standard entomological bag. Observations of habitat changes are also carried out - traces of negative processes (anthropogenic influence, pollution, water level change, advanced succession) and their impact. The collected data is filled in a corresponding field form. All characteristic moments during the study, such as the general view of the habitats, the identification of the studied species and detected damages from human activity, are captured with a digital camera.

Stationary work

Field form data is filled in the main database if not done in the field.

Necessary technical equipment

The necessary technical equipment covers:

1. suitable personal equipment for field work;
2. small backpack;
3. high boots;
4. binoculars (8x42 is most convenient);
5. GPS;
6. camera;
7. thermometer and hygrometer;
8. entomological bag;
9. field notebook;
10. laptop;
11. batteries;
12. magnifying glass;

6.2. Amphibians and Reptiles

6.2.1. Methodology for monitoring Amphibians and Reptiles

The present methodology is valid for all species of amphibians and reptiles, objects of monitoring of species from the five main groups of amphibians and reptiles: tailed amphibians (Caudata), tailless amphibians (Anura), turtles (Testudines), lizards (Sauria), snakes (Serpentes)

Field work

Stages of the field work in the trial area: Crawling/finding/measurement In the trial area, the walk follows the habitats suitable for the species(s) at the discretion of the experts. All amphibians and reptiles seen are recorded, if they are caught, their gender and age category are also determined, and the necessary measurements are taken. For each specimen seen/caught/recognized by remains (individual recognizable elements or parts of species found), geographic coordinates are taken. All remains and traces of life activity found (turtle holes, characteristic tracks/tracks of land turtles) that can be reliably linked to a species are also reported. Fieldwork requires active search for species, which includes: turning over rocks; stumps and other suitable shelters; track tracking (of land turtles); active search off roads and trails. Binoculars are required for some species – *M. rivulata*. Determinant of amphibians and reptiles in Bulgaria. Sofia, Zeleni Balkani, 196 c. Capture All species, except newts (*I. alpestris*, *T. dobrogicus*) will be captured directly if possible. When choosing the right technique for catching amphibians and reptiles, the leading principle is the "minimum direct impact" on them; After capture, amphibians and reptiles are measured as quickly as possible and released after they have been uniquely identified; In all cases of doubt as to the species affiliation of the respective amphibian and reptile specimens, a general plan, as well as their characteristic species-specific marks, shall be photographed; All amphibians and reptiles for which there is doubt as to species affiliation or have atypical features (eg partial albinism, injuries, strange formations, atypical growths, etc.) are also photo-documented; all caught specimens must be released at the place of their capture! Transportation to another place and their release in an unknown area is not allowed; Method for catching newts - Water bodies with a depth of more than 30 cm - placing live traps.

Stationary work

All data are downloaded from the GPS device and placed in appropriate folders. In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. A preliminary analysis of the received data on the presence/absence of the indicator species is performed.

Necessary technical equipment

The necessary technical equipment covers:

1. Caliper – for measuring the linear dimensions of the caught specimens;
2. Ruler – for measuring the linear dimensions of the caught specimens, which cannot be measured with a caliper;
3. Scales (scales) – to measure the weight of the caught specimens;
4. Camera - for photo documentation of the caught specimens;
5. GPS device for reporting the route and positioning of the caught specimens;
6. Binoculars – for remote monitoring in hard-to-reach areas;
7. Livestock trap (for newts);

8. Rubber boots (to access the ponds where the traps will be placed).
9. Thermometer;
10. Tongs for catching snakes;
11. Fisherman's caps for catching the animals with a long handle (telescope type) and mesh of the bag with a fine mesh, or gas.

6.3. Methods for monitoring mammals

6.3.1. Golden Jackal monitoring methodology (*Canis aureus* Linnaeus, 1758)

Field work

Two monitoring areas have been selected. The distance between photo traps should be approximately 2 km (± 300 m). Photo traps are placed near animal paths that are more likely to be crossed by members of the target species. Placed photo-traps remain at one point for 5-30 days. When placing each photo trap, a form (paper or electronic) is filled out, coordinates are taken with a GPS device and a photo is taken of the location for reference. The characteristics of the habitat are described.

To increase the probability of registration of the target species, an odor lure is placed in front of each photo-trap. The lure consists of valerian tincture (*Valeriana officinalis* L. & Maillefer) mixed with fat (oil) in a ratio of 3:1, in order to reduce the volatility of the alcohol extract and prolong the effect. The mixture is applied to a piece of absorbent material (sponge, piece of absorbent cloth, etc.) and fixed in a convenient place (stem/branch) about 1.5 - 2 m in front of the photo-trap, at a height of about 60-80 cm. odors attract predators such as jackals. According to some authors (Mech, personal communication), such odors attract them mainly because of developed exploratory behavior.

When approaching the place intended for placing a photo-trap, an attempt is made to place the same place, and if impossible, a suitable place is chosen (near an animal path, near a water source, if available). When determining the location, the photo-trap is placed on a tree, at a height of about 50 cm (± 20 cm), stable to prevent it from moving due to strong wind, being pushed by an animal, etc. The space in front of the photo-trap is cleared of tall grasses and other vegetation which, when moved by the wind, could activate it. The bait is installed about 1-1.5 m in front of the photo-trap, on a suitable tree, branch or other.

Fill in all the necessary information in the form, regarding the placed photo trap and the habitat around it. The coordinates of the place are recorded, a photo is taken for reference, the photo-trap is activated and the place is left.

With the technique of placing photo-traps in this way, within the provided distances, it is possible to install about 10 photo-traps per day, by one team.

Stationary work

All data are downloaded from the GPS device and placed in appropriate folders. In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. An analysis of the collected data on the presence/absence of the indicator species is performed.

Necessary technical equipment

The necessary technical equipment covers:

1. Photo traps;
2. Scent lure (see above) and installation supplies (absorbent cloths, nails and hammer);
3. GPS device;
4. Camera;
5. Roulette.

6.3.2. The European wildcat monitoring methodology (*Felis silvestris* Schreber, 1777)

Field work

Monitoring of the wild cat is carried out using photo traps. In the locations of the photo traps in the selected monitoring areas, whether the target species is registered or not, as well as the general condition of the habitats, is taken into account.

Monitoring areas are determined based on literature data and potential habitats and so that they are representative of the distribution of the species.

Within one monitoring territory, 2 test areas and 2 points are defined. Each sample area is divided into four equal parts, 1/1 km squares. One photo trap should be placed in each square - a basic sampling unit in the wild cat monitoring methodology. It is recommended that phototraps be placed 1-1.5 km apart (Kilshaw & Macdonald, 2011). A shift from the initially set point for placing a photo trap is allowed within $\pm 200\text{m}$ in the event of impossibility or sub-optimal conditions for its installation. Optimal conditions are defined as: presence of a tree for anchoring, absence of anthropogenic presence, presence of animal tracks near the site and/or traces of animal activity. After the initial determination of phototrap locations, they remain permanent unless permanent habitat changes occur (deforestation, fire, anthropogenic presence, etc.).

Photo traps are activated in the field for 5-30 days. It is important that the period is short in order to maximally meet the requirement of "closure" of the monitored population (Rowcliffe et al., 2008). Due to the extremely secretive way of life and the need to distinguish hybrids from "pure" wild cats, bait is used in order to increase the probability of registration and the

possibility of obtaining more and better footage of an individual for its correct identification (Ancrenaz et al., 2012). Using a decoy allows the phototraps to not only look for animal trails to place when installing them, but to be able to place them at the pre-defined grid point if it meets the conditions regardless of whether there is a trail or not.

The bait consists of valerian tincture (*Valeriana officinalis* L. & Maillefer) mixed with fat (oil) in a ratio of 3 to 1, in order to reduce the volatility of the alcohol extract and prolong the effect. The bait is applied to a piece of hair-retaining material (e.g. velcro), nailed against the photo trap at a distance of about 1.5 - 2.5 m. The placement height depends on the specific conditions and is determined by the experts on site, but it should not be higher than the phototrap placement line.

At the expert's discretion, in places without anthropogenic presence, photo traps with a white flash are used to improve the possibility of identifying the target species, and in places with an increased or likely anthropogenic presence - those with an infrared flash.

The camera traps are pre-set to take 3 consecutive pictures in order to increase the probability of capturing and determining the recorded species. The video function is not used because white flash photo traps cannot capture night time, and the resolution of the video is lower and it is difficult to determine the details of the spots.

Monitoring is carried out according to the following scheme:

1. Allocating the places to place photo traps between the individual teams and defining the optimal number to place for the day. Determining the optimal route;
2. Checking all photo traps for the presence of charged batteries and memory cards;
3. Setting all photo traps to take 3 consecutive photos, check date and time;
4. Upon reaching the pre-defined point, the location is surveyed and a suitable place is chosen based on expert judgment (animal path, hollow tree, etc.) for installing the photo trap. If the place is unsuitable (anthropogenic structures, disturbance, open area without trees, etc.) a suitable one is found in the maximum proximity (± 200 m) and the reason for the displacement is noted on the form;
5. When the place is selected, the photo trap is installed at a height of up to 80 cm, stable so that it does not move as a result of stronger wind for example. The area immediately in front of the phototrap is cleared of fallen twigs or grass that could activate it. The decoy is mounted against the phototrap on a tree (branch). It is carefully checked whether the photo trap is activated before leaving the place;
6. Accurate GPS coordinates are taken and the placement location **is photographed**.

Stationary work

All data are downloaded from the GPS device and placed in appropriate folders. In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. A preliminary analysis of the received data on the presence/absence of the indicator species is performed.

Necessary technical equipment

The necessary technical equipment covers:

1. Photo traps;
2. Scent lure (see above) and installation supplies (absorbent cloths, nails and hammer);
3. GPS device;
4. Camera;
5. Roulette.

6.3.3. Methodology for monitoring the Dobrudzhan hamster (*Mesocricetus newtoni*) and Common hamster (*Cricetus cricetus*)

Field work

Hole registration is a widely used method (France, Poland, etc.), but it has a high probability of error because the holes are similar to those of the laluger and the common hamster. These two methods are complementary, because the transect method is used to walk and survey suitable habitats during the day and select potential ones to set traps at dusk.

The main research method is the transect method.

Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. An analysis of the collected data on the presence/absence of the indicator species is performed.

Necessary technical equipment

- GPS;
- plastic bags;
- mammal identifier;
- lures;
- binoculars 10x50;

- roulette;
- transport - high passable vehicle.

Methodology for monitoring ferrets - Musteloidea

Field work

Registration with photo traps - 2 photo traps are placed. They are located as uniformly as possible in suitable habitats according to expert assessment. As the distance from each other is more than 1 km.

The following activities are carried out in the area of the territory:

1. Visual observation while traversing the transect in order to register ferrets or traces of their vital activity, as well as collecting data on the characteristics of the habitat, food base and threats. Photographs are taken of the habitat, traces of the vital activity of potential prey, if any.

2. Choosing a suitable place to place the photo trap. The site selection criteria consist of combining the maximum probability that it will be visited by the target species and the minimum probability that the phototrap will be seen by humans and/or repeatedly activated until the memory is filled by passing animals (e.g. cattle herds) or other ;

3. Placement of photo traps. At the selected location, the photo trap is placed on a suitable object (tree, bush, rock) at a height of no more than 50 cm above the ground.

If necessary, the space in front of the photo trap is cleared of grass and small twigs, which, when shaken by the wind, can trigger it. A bait of valerian and ferret droppings is placed next to or in front of it in a suitable place. Before leaving the place, it is checked whether the photo trap is activated. The location with the photo trap is photographed and GPS coordinates are taken. In the form, the number of the GPS point and the photo, the date and time of placement, the type of bait and a brief description of the place are recorded;

4. Collecting the photo traps. Phototraps are removed from the field.

Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. A preliminary analysis of the received data on the presence/absence of the indicator species is performed.

Necessary technical equipment

- Photo traps with red flash;
- GPS;
- Camera;

- Lure (fixed with technical vaseline, valerian, ferret excrement);
- Car.

7. RESULTS

7.1. Flora

The territory of the future FEC is located in an area dominated by intensively cultivated monocultures, in places intersected by forest protection belts. During field research, 5 EUNIS-classified habitat types were identified (Davies et al. 2004 - <https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification/documentation/eunis-2004-report.pdf/download>), Habitats established in the study area and their EUNIS classification

Table 2: Habitats in the Project area

Nº	Habitat type	EUNIS
1	Unmanaged xeric grassland	E1.D
2	Robinia plantations	G1.C3
3	Lines of trees	G5.1
4	Airport runways and aprons	J4.4
5	Large-scale intensive unmixed crops (>25ha)	I1.11

E1.D Unmanaged xeric grassland

Xeric grassland that is not currently mown or used for pasture





Mainly found: loose cornflower (*Centaurea diffusa* Lam., Asteraceae), sun cornflower (*Centaurea solstitialis* L., Asteraceae), annual immortelle (*Xeranthemum annuum* L. (common

immortelle) Asteraceae), cylindrical immortelle (*Xeranthemum cylindraceum* Sibth.&Sm., Asteraceae) and blue gall (*Cichorium intybus* L., Asteraceae). Single specimens were observed, extremely rare of the species - bellisma (*Dichanthium ischaemum*), Poaceae), bulb meadow (*Poa bulbosa* L., Poaceae), black sedina (*Chrysopogon gryllus* (L.) Trin., Poaceae). In the servitude zone of the asphalt roads that surround them, the existing vegetation is represented by ruderal species such as heather (*Agropyrum repens*), reed (*Cinodon dactylon*), blue gall (*Centaurea cyana*), white yarrow (*Achillea mellifolium*).

G1.C3 Robinia plantations





Plantations and spontaneous formations of *Robinia pseudacacia*. Vegetation of alliances *Chelidonio-Robinion* and *Balloto nigrae-Robinion*.

G5.1 Lines of trees





More or less continuous lines of trees forming strips within a matrix of grassy or cultivated land or along roads, typically used for shelter or shading. Lines of trees differ from hedgerows (FA) in being composed of species that can grow to at least 5 m in height and are not regularly cut down to a height below 5 m.

Acacia (*Robinia pseudoacacia*), single walnut (*Juglans regia*), gorse (*Gleditsia triacantha*), American ash (*Fraxinus americana*), White mulberry (*Morus alba*), plum (*Prunus cerasifera*), hawthorn (*Crataegus monogina*), thistle (*Prunus spinosa*) and rosehip (*Rosa canina*).

J4.4 Airport runways and aprons

In airports, hard surfaces other than buildings.





April, 2023

Airport building = airport tower not intended to be part of the FPP project. The contractor did not provide access to it and it was not checked for bats.



May 2023 r.

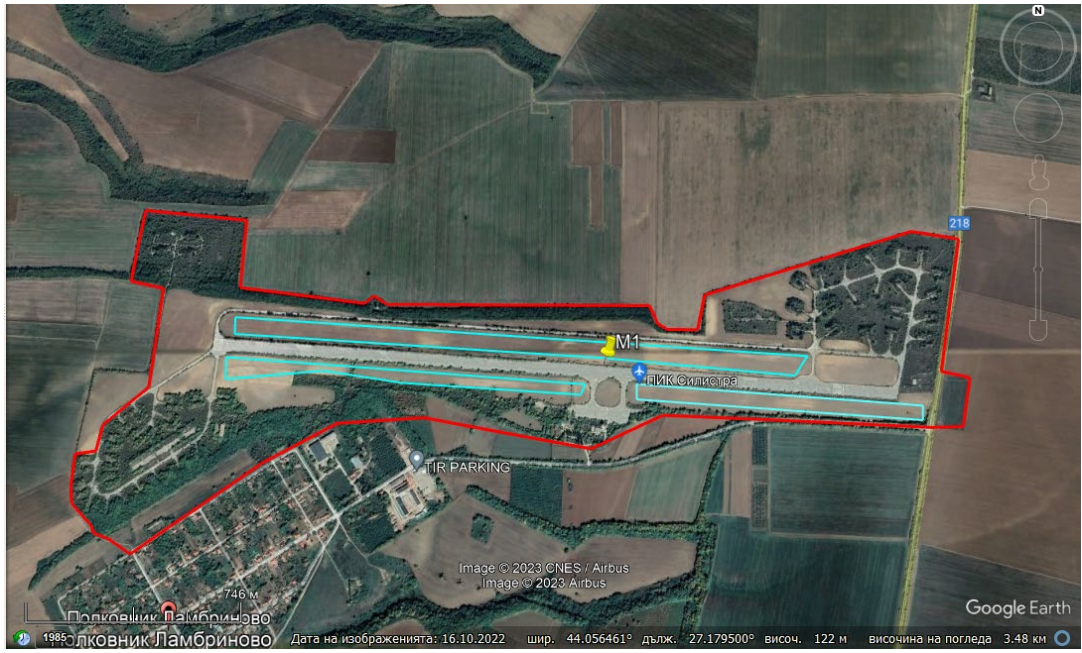


Two abandoned buildings at the entrance to the airport from the east.

They were demolished in May 2023

Acacia (*Robinia pseudoacacia*), single walnut (*Juglans regia*), gorse (*Gleditsia triacantha*), American ash (*Fraxinus americana*), White mulberry (*Morus alba*), plum (*Prunus cerasifera*), hawthorn (*Crataegus monogina*), thistle (*Prunus spinosa*) and rosehip (*Rosa canina*).

11.11 Large-scale intensive unmixed crops (>25ha)





On abandoned arable lands and fields there is secondary weedy and ruderal vegetation, and during secondary successions in different directions, serial plant communities were formed, which can be included in different successional orders. The species *Centaurea rhenana* Boreau, knotweed *Torilis* (*Torilis nodosa* (L.) Gaertner), reed (*Cynodon dactylon* (L.) Pers.), ordinary blue gall (*Cichorium intybus* L.), bristly heather (*Elymus hispidus* (Opiz.) Meld.), yellow gorse (*Anthemis tinctoria*), *bromus inermis* Leysser, thistle (*Carduus acanthoides* L.), common

	<i>Helicoverpa armigera</i> (Hübner, 1808)*
	<i>Chloridea maritima</i> (Graslin, 1855)*

16 species of the Homoptera suborder have been identified, which belong to 4 families and 13 genera to them. The insects of the order Hymenoptera, which inhabit the phytia, belong to 9 superfamilies. 14 families and 10 genera have been identified. From the Diptera order, insects from 10 families and 13 genera have been identified. Order Lepidoptera in this crop is represented by 5 species, which belong to 5 genera of 2 families. The orders Orthoptera (4 species from 3 families), Thysanoptera (3 species from 2 families) and Neuroptera (1 species) have the lowest species diversity. The species composition is determined by the cereal crops and orchards available in the area - mainly represented by peaches, plums, cherries and apricots.

Table 3: Corn and sunflower leafhopper species that predominate in the area.

Family	Species
Cixiidae	<i>Cixius simplex</i> (Herrich-Schaffer 1835)
	<i>Hyalesthes obsoletus</i> Singoret 1865
	<i>Reptalus quinquecostatus</i> (Dufour 1833)
Delphacidae	<i>Dicranotropis sp.</i> Fieber 1866
	<i>Javesella sp.</i> Fennah 1963
	<i>Javesella pellucida</i> (Fabricius 1794)
	<i>Laodelphax striatellus</i> (Fallen 1826)
	<i>Muirodelphax aubei</i> (Perris 1857)
	<i>Ribautodelphax angulosa</i> (Ribaut 1953)
Issidae	<i>Hysteropterum sp.</i> Amyot & Serville 1843
Aphrophoridae	<i>Philaenus spumarius</i> (Linnaeus 1758)
Cicadellidae	<i>Anaceratagallia ribauti</i> (Ossiannilsson 1938)

Family	Species
	<i>Austroagallia sinuata</i> (Mulsant & Rey 1855)
	<i>Balclutha rhenana</i> Wagner 1939
	<i>Cicadella viridis</i> (Linnaeus 1758)
	<i>Cicadula placida</i> (Horvath 1897)
	<i>Empoasca pteridis</i> (Dahlbom 1850)
	<i>Eupteryx aurata</i> (Linnaeus 1758)
	<i>Hardya anatolica</i> (Zachvatkin 1946)
	<i>Macropsis</i> sp. (Lewis 1834)
	<i>Macrosteles leavis</i> (Ribaut 1927)
	<i>Megophthalmus scanicus</i> (Fallen 1806)
	<i>Mocuellus collinus</i> (Boheman 1850)
	<i>Neoliturus fenestratus</i> (Herrich-Schaffer) 1834)
	<i>Ophiola</i> sp. (Edwards 1922)
	<i>Ophiola transversa</i> (Fallen 1826)
	<i>Psammotettix alienus</i> (Dahlbom 1850)
	<i>Psammotettix provincialis</i> (Ribaut 1925)
	<i>Psammotettix striatus</i> (Linnaeus 1758)
	<i>Typhlocyba quercus</i> (Fabricius 1777)
	<i>Zygina pullula</i> (Boheman 1845)

In the middle of June 2023, all vegetation was removed from all terrains intended for the construction of the FPP. This led to a complete change of the species composition and the significant reduction of species. In mid-August 2023, the vegetation on the areas designated for the construction of the PP(photovoltaic project) partially recovered, but the species composition did not.

1.1 Amphibians and reptiles

Three species of amphibians and 6 species of reptiles were found.

family Bufo nidae	<i>Bufo</i> <i>viridis</i>
family Rana idae	<i>Rana</i> <i>dalmatina</i>

The species are found in characteristic habitats:

Class Amphibia		Established habitats
Order Anura		
family Bufo nidae	<i>Bufo</i> <i>viridis</i>	Arable fields and asphalt roads (airport runways)
family Hyla idae	<i>Hyla</i> <i>orientalis</i>	Strips of trees in a north and south direction from the boundary of the property
family Rana idae	<i>Rana</i> <i>dalmatina</i>	Strips of trees in a north and south direction from the boundary of the property
Class Reptilia		
Order Squamata		
family Lacerta idae	<i>Podarcis</i> <i>muralis</i>	Buildings at the airport tower
	<i>Lacerta</i> <i>viridis</i>	Buildings at the airport tower
	<i>Ablepharus</i> <i>kitaibelii</i>	Strips of trees in a north and south direction from the boundary of the property

family Anguidae	<i>Anguis fragilis</i>	Strips of trees in a north and south direction from the boundary of the property
family Colubridae	<i>Dolichophis caspius</i>	Arable fields and asphalt roads (airport runways)
	<i>Zamenis longissima</i>	Strips of trees in a north and south direction from the boundary of the property

Maps of the characteristic habitats of amphibian and reptile species

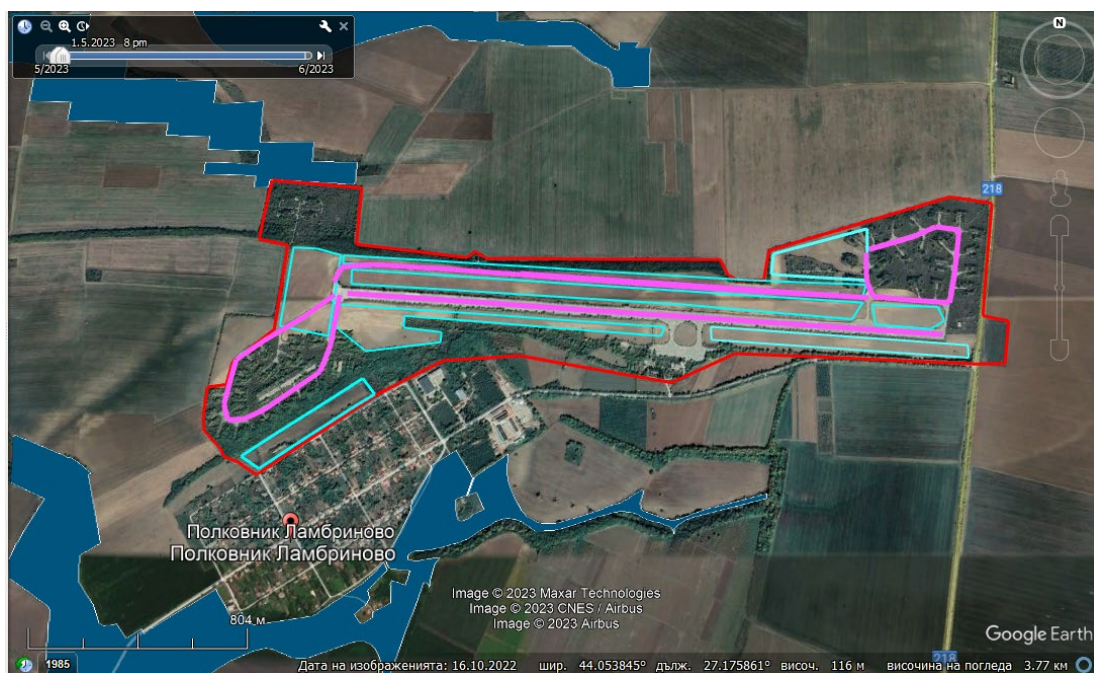


Figure 6: Arable fields and asphalt roads (airport runways)



Figure 7: Buildings at the airport tower

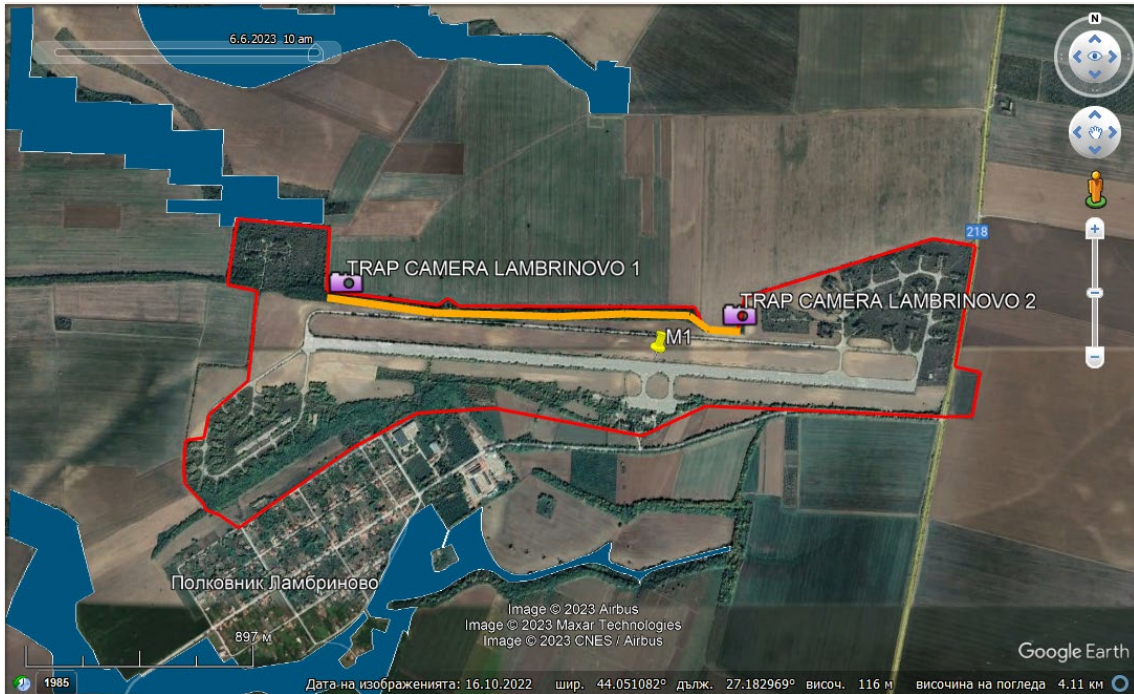


Figure 8: Strips of trees in a north and south direction from the boundary of the property

The identified species are not of conservation importance at the national and European level. These are species that are often found in populated areas - cities and villages or settlements, parks and gardens, widespread throughout the territory of Bulgaria.

7.3. Mammals (except bats)

The methods described in the previous parts of the report were applied, and in addition to the transect methods, the use of phototraps was also applied at two points in the northern part of the landfill planned for the PP, where there is a strip of trees mainly of acacia at the border of the ecotone:



TRAP CAMERA LAMBRINOVO 1 – GPS: N 44.057371°, E 27.166504°



With this method and with TRAP CAMERA LAMBRINOVO 1, 3 types of mammals were identified:



Figure 9: *Capreolus capreolus*



Figure 10: *Vulpes vulpes*



Figure 11: Apodemus sylvaticus

TRAP CAMERA LAMBRINOVO 2 – GPS: N 44.056155°, E 27.186628°



No individuals of the mammal group were found at this camera.



Figure 12: *Lepus europaeus*



Figure 13: *Sciurus vulgaris*

Based on the applied and other observation methods described above, the following mammal species were identified in total:

Table 4: Mammal species identified in the Project area

	LATIN NAME	DIR. 92/43	BERN CON.	IUCN Red list, ver.3.1 (2016)	RED LIST BG (2011)	BIODIVERSITY ACT (BDA), Bulgaria
ORDER EULIPOTYPHLA						
Family Erinaceidae						
1	<i>Erinaceus concolor</i>			LC		BDA- III
Family Soricidae						
2	<i>Crocidura leucodon</i>		III	LC		
3	<i>Crocidura suaveolens</i>		III	LC		

Family Talpidae						
4	<i>Talpa europaea</i>			LC		
Order LAGOMORPHA						
Family Leporidae						
5	<i>Lepus europaeus</i>		III	LC		
Order RODENTIA						
Family Muridae						
6	<i>Apodemus agrarius</i>			LC		
7	<i>Apodemus flavicolis</i>			LC		
8	<i>Apodemus sylvaticus</i>			LC		
9	<i>Mus musculus</i>			LC		
Family Arvicolidae						
10	<i>Microtus arvalis</i>			LC		
Family Sciuridae						
11	<i>Sciurus vulgaris</i>		III	LC		
Order CARNIVORA						
Family Canidae						
12	<i>Vulpes vulpes</i>					
13	<i>Canis aureus</i>			LC		
Family Mustelidae						
14	<i>Mustela nivalis</i>		III	LC		BDA- III
15	<i>Meles meles</i>		III	LC		
Order Artiodactyla						
Family Cervidae						

16	<i>Capreolus capreolus</i>		III	LC		
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The established species are widespread and the assessment of their conversion status is stable and unchanging, and the effects of the affected habitats will not lead to a reduction in their habitats and population numbers. They use the territory of the described habitats mainly as places to search for food.

2.1 BIRDS (AVI-FAUNA)

7.3.1. Assessment of Baseline Conditions

Recent species of birds have been registered on the territory of Bulgaria, some of which were considered extinct in Bulgaria, and others are single migratory specimens.

The distribution and numbers of birds are changing as a result of human activity and natural processes. Some species are expanding their ranges, occupying new territories, while others are found in fewer and fewer places and are threatened with extinction.

7.3.2. Bird Migration survey

The aim of the Bird Migration Survey is to establish:

1. Species composition
2. Flight height
3. To what extent the birds use the affected area, i.e. what is their behavior and in which areas of the IP and what they use the territory for: searching for food, resting, sleeping or others.
4. Impacts and threats to species
5. Measures to mitigate impacts and threats to species

7.3.3. Nesting bird survey

The aim of the breeding bird survey is to establish:

1. Species composition
2. Attachment of species to certain habitats
3. Relative Number of Couples and Individuals
4. To what extent do birds use the affected area, i.e. what is their behavior and in which areas of the territory of the future PP and what they use the territory for: searching for food, resting, sleeping or others.
5. Measures to mitigate impacts and threats to species

7.3.4. Survey of wintering bird species

This part will be the subject of the final version of the report, winter monitoring is in progress.

7.4. Baseline Assessment Methodology

7.4.1. Bird migration

When carrying out studies on migration, the emphasis is on presenting in a unified way the qualitative and quantitative composition of migrants and the main parameters of their flight (BDZP, 2008; Michev, Profirov, 2010).

The visual survey of the migration of flying birds is carried out by direct observations from predetermined permanent stationary points (observation points - NP), daily throughout the migration period, during the daylight hours (7:00 - 18:00 astronomical time). In the period March 15 - May 15, the survey is carried out until 17:00 astronomical time, and in the period October 1 - 31, the survey is carried out until 16:00 astronomical time, due to the reduced length of the day.

During the survey, the airspace within a radius of up to 4000 m around the NP (up to 7000 m for large flocks of storks or pelicans) is monitored and all migratory birds passing through this space are described. Airspace control and how to describe all birds is detailed below.

When flocks of storks or pelicans, or gatherings of birds of prey stopping for the night or landing during the day, are observed during the daytime surveys, the places where the birds were observed are visited at the end of the day, in order to precisely locate them and mapping.

During the field surveys, all identified cases of human activities that pose some kind of threat to

In connection with the implementation of the objectives of the present study, a review of the available information and identification of the species composition of bats and birds in the IP area was initially carried out.

After reviewing the existing literature, scientific publications and articles, it can be concluded that the different regions in Bulgaria have not been studied in detail and evenly, as well as many of the species - representatives of the different ecological categories.

So far in Bulgaria there is no publicly available database on the distribution of bats by region and specific underground sites.

Based on a comparison between available habitats and functional features, on the relief, taking into account the existing shelters, places with high insect abundance and flight corridors, a conclusion was made about the species composition of bats in the investment proposal (IP) area.

Field research methods

The following methods of field study of the migration of flying birds are based on the methods developed and applied in recent years (БДЗП, 2008; Зехтинджиев, 2009; Мичев, Профиров, 2010 и 2011), accordingly improved and perfected on the basis of accumulated practical experience, both in Bulgaria and in other countries (Desholm et al. 2006; Dirksen et al. 2007; Krijgsveld et al. 2009; Liechti, 2001; Liechti et al. 1995; Madders et al. 2006; Liechti F., 2001; Schmaljohann et al. 2008; SNH 2009; Zehindjiev et al. 2003).

Field study of migration for monitoring purposes includes survey of soaring birds. For all soaring birds, the primary method is visual migration survey.

7.4.2. A visual study of the migration of soaring birds

Description of the method

When carrying out studies on migration, the emphasis is on presenting in a unified way the qualitative and quantitative composition of migrants and the main parameters of their flight (БДЗП, 2008; Мичев, Профиров, 2010).

The visual survey of the migration of flying birds is carried out by direct observations from predetermined permanent stationary points (observation points - OP), daily throughout the migration period, during the daylight hours (7:00 - 18:00 astronomical time). In the period March 15 - May 15, the survey is carried out until 17:00 astronomical time, and in the period October 1 - 31, the survey is carried out until 16:00 astronomical time, due to the reduced length of the day.

During the survey, the airspace within a radius of up to 4000 m around the OP (up to 7000 m for large flocks of storks or pelicans) is monitored and all migratory birds passing through this space are described. Airspace control and how to describe all birds is detailed below.

When flocks of storks or pelicans, or gatherings of birds of prey stopping for the night or landing during the day, are observed during the daytime surveys, the places where the birds were observed are visited at the end of the day, in order to precisely locate them and mapping.

During the field surveys, all identified cases of human activities that pose some kind of threat to the target species and/or their habitats will be recorded.

Selection of observation points

The selection of observation points (OPs) for migration is guided by the following criteria:

1. Excellent visibility in the defined perimeter (minimum 4000 meters, up to 7000 m in layer up to about 500 m height above the horizon line) around the observation point; this means that:
 - a. The NP must be located in an open place;
 - b. to be raised in relation to the surrounding territories;
 - c. not be adjacent (less than 1000 m) to forests, buffer forest belts or rocks, tall buildings that would obstruct visibility, especially to the direction from which migrants are expected to emerge.

Tall buildings in settlements, with adequate visibility on all sides (located in high parts of the village, with terraces) can also be used in the absence of other alternatives in the area.

2. Appropriate geographical location. The location of OPs on hills, plateau edges or river valleys is suitable for monitoring migration because it is combined with good visibility and

geographical structures that birds are likely to follow or cover flying low. In this sense, observation points can also be located at the foot of mountains or in their transitional parts, but in this case it is recommended that the high parts of the mountains are in the direction opposite to the direction from which the birds come.

3. Appropriate logistics arrangement. As the migration is monitored daily over a period of 2 to 3 months, including in adverse meteorological conditions (MTO), it is important when selecting an observation point that it is relatively easily accessible and connected to the base where the observers stay. People need to be able to get food and water and have hygienic living conditions combined with economical transport costs. In this sense, the observation point must be accessible by car even in unfavorable conditions (rain), not more than 1 - 1.5 km away from the base where the observers are, especially if they do not travel by car every day or if the base not a caravan situated on the point itself.

4. Comprehensive / representative coverage of the study area. When the survey is carried out in a large territory that cannot be covered by 1 OP (distance between its borders 8,000 m), then a larger number of points corresponding to the objectives of the field survey is selected. When choosing more than one observation point, attention is paid to the following aspects:

a. Observation points must cover the entire surveyed territory without overlapping the perimeters of visibility; the minimum distance between two observation points, when there is no visual barrier between them, is 8,000 m;

b. When the study area is too large (for example for national studies) and financial / human resources are insufficient, the selection of observation points should be such as to allow maximum complete coverage of the area. When the territory is unexplored or unevenly explored, observation points are placed evenly, taking into account the objectives of the field survey (linear or in groups). When the nature of the migration is well known (for monitoring purposes), NPs are deployed at sites of intensive overflight, and for each such point an adjacent control area must be selected where no intensive overflight is considered to occur. For national level surveys, coverage of at least 20% of the presumed migration front is allowed. This percentage grows as the area of the studied territory decreases.

5. Location near protected areas for birds. Wherever possible, observation points should be selected in or near protected bird areas, as long as the relatively even distribution of observation points is not disturbed.

Types of data collected in the field

1. Meteorological conditions (MTO): air temperature (t°C), wind direction, wind force (on the Beaufort scale, and if possible - in m/s); visibility (m); presence of fog/haze/other reason for reduced visibility; precipitation (snow/rain and their intensity); clouds (cloud type and % coverage); presence of snow cover/icing (MTOs are calculated every round hour, and between hours - only if there is a sudden change in the weather). The method of collecting and recording this data is presented in detail below, and the standards for the individual physical quantities.

2. Period of each individual observation - start (hour:minutes) and end (hour:minutes)

3. Species composition of migratory soaring birds (Species). Determination to species (generic + species name, e.g. *Circus pygargus*) and, if not possible, to the most accurate taxonomic unit possible: two related species (generic name and species names of related species separated by a slash), e.g. *Circus pygargus /macrourus*; genus, eg *Circus* spp. or a larger taxonomic group - "unspecified raptor" (OP). In addition, gender, age and morphological differences (e.g. light or dark phase) are reflected if they can be determined visually. Age is defined in the following categories: juvenes (juv.), immaturus (imm.), adultus (ad.) and senecio (sen.). Where possible, more precise age categories are also covered (e.g. "second summer"), which, however, requires considerable experience.

4. Quantitative composition of migratory flying birds (Number). The number of migratory birds is counted individually for each species in individuals, counting the number of female/male individuals or young/adult individuals separately.

5. Flight height. Vertical distances are measured relative to the ground surface over which the birds fly. In cases where the birds fly below the level of the OP and it is not possible to estimate the height relative to the surface, then the vertical distance relative to the plane in which the OP lies is recorded, with a negative sign.

6. Horizontal distance of the trajectories of flying flocks or single birds relative to the observation point. Distances from the OP, regardless of whether they are horizontal or vertical, are recorded in meters. Horizontal distances are measured relative to the OP, and the direction relative to the OP is also determined.

7. Direction of flight; flight path; type of flight. The direction from which and the direction in which the observed specimen is flying, any changes in the flight path, and whether the flight is active (AP), direct planning (DPP), hovering (RP) or a combination of these are reflected. The trajectory of each individual flying or of an individual flock is plotted on the work chart and the trajectory number is recorded on the field form.

8. Other behavior of migratory birds - hunting, landing/taking off during the day or at night (the hours and any other features are reflected).

9. Other observations.

Where possible, any additional information on migrant behaviour, species relationships, responses to environmental changes or threats, etc. is covered.

7.5. Method of data collection and recording in standard migration surveys

7.5.1. Standard migration observations

The airspace must be effectively controlled at least in a semi-circle of 180° and a radius of 7000 m, with the direction of the semi-circle directed against the main direction of migration (for example, in autumn - the direction of observation is to the north / north-east / north-west). When it is known in advance that due to geographical features the birds do not adhere to the "standard" migration directions, or when the main direction of migration is not known, it is necessary to control the entire airspace around the OP.

Airspace control is performed sequentially with:

A) Unaided eye - to search for migratory birds by slowly scanning the sky from left to right and back at intervals of 5 min or more until an object is located. Using quality sunglasses and a hat with a visor makes spotting the birds much easier, especially when they are on the counter.

B) Binoculars - to search for migrants by scanning the airspace in a zigzag manner up - down and from left to right; to determine the species affiliation of already detected migrants; to determine the species affiliation of birds in mixed flocks and to count individuals in flying flocks; a binocular stand (a short stick to which the binoculars are attached and the base of which rests against the observer's body/clothing) can be used to facilitate binocular search. In this way, the arms are located at chest height and tire less.

C) Sighting tube - to search for migrants in the remote part of the airspace around the OP (mainly in the horizontal plane), by scanning the space from left to right and vice versa slightly progressively from bottom to top; the scope is not used to detect migrants near the OP; used to detect migrants at long distances and to determine the species affiliation of migrants detected with the naked eye or binoculars;

When carrying out the observations by one observer, the inspection of the airspace with the naked eye and with binoculars alternates, and depending on the nature of the flight in the given area, it is also recommended to inspect the horizon with a tube every 10-15 minutes. When carrying out the observations from two or more observers the tasks are distributed, always having at least one person observing the airspace with the naked eye while the other(s) survey the sky with binoculars or a spotting scope.

The visible airspace around the observation point is surveyed systematically, as described above, until an individual or flock of birds being surveyed is recorded. Each individual or flock that enters the field of view is observed until they are lost from sight and is described regardless of the initial distance from the OP where they are established. The following steps apply when monitoring and recording data:

7.5.2. Logging start of observation (hour:minutes) and observation time.

A. Flying birds. For each observation, the exact starting time of recording the birds (h:min) is recorded in form M1. When large flocks of storks or birds of prey pass by, and when birds linger

in the area looking for thermals to gain altitude, gain altitude, or land due to bad weather conditions, in addition to the start time of observation, the end time is also recorded. When registering more than one species of flying birds at the same time in a mixed flock, they are marked on the M1 form with a "+" between the individual lines. When individuals fly at different locations relative to the observation point at the same time, they are attached to the same observation time, but in separate rows. In the event that flocks of birds of prey are registered, i.e. the so-called "tracks", the established numbers can be added to the same starting time, but at the end the end time of the observation is indicated.

B. Non-breeding birds. All types of non-flying birds that migrate during the day are also subject to visual observations during the day. Water-loving non-flying birds (herons, ducks, plovers, gulls) as well as bee-eaters are noted in the same way as flying birds on form M1.

7.5.3. Determination of species, gender and age

A. Flying birds. The number of flying bird species in Bulgaria is 5 species of waterfowl from the orders Pelecaniformes, Ciconiiformes and Gruiformes) and 37 species of diurnal birds of prey from the order Accipitriformes. For their determination, field identifiers for birds and specialized publications for individual groups or species of birds can be used (Forsman, 1999; Porter et al., 1986; Beaman, Madge, 1998; Svensson & Grant, 1999, 2001; Симеонов и др., 1990; Симеонов & Мичев, 1991; Нанкинов и др., 1997 и др.). As already mentioned, the birds found are determined depending on the conditions and possibilities to a species, to a pair of species, to a genus or to an order. It is accepted to use the following "tandems" of species which, due to deteriorating observation conditions or for other reasons, cannot be determined to species:

Accipiter nisus and Accipiter brevipes - Accipiter nis./brev.

Circus pygargus and Circus macrourus - Circus pyg./mac.

Aquilapomarina and Aquila clanga - Aquilapom./clanga

Aquila heliaca and Aquila nipalensis - Aquila hel./nip.

Falco tinnunculus and Falco naumanni - Falco tin./naum.

In some cases it is possible to determine only to genus: *Accipiter* sp., *Circus* sp., *Falco* sp. In the case of the last genus, it is necessary, if possible, to explicitly note whether it is a question of large or small falcons. A "tandem" of *Buteo/Pernis* can also be used. For the correct determination of the species affiliation of the birds of prey, their profile in flight is essential, which is an important diagnostic feature.

After determining the species belonging to the migrants, they proceed to determine their gender. However, this can only be done in certain species in which sexual dimorphism is clearly expressed: the four species of warblers, the blackthorn and the evening kestrel. The next activity is age determination. This can also only be done with certain species such as the pink and curled pelican, the four species of waders (but not always and surely), the golden eagle, the steppe eagle, the evening kestrel. Age is defined in the following categories: juvenes (juv.), immaturus (imm.), adultus (ad.) and senecio (sen.).

B. Non-breeding birds. Determining non-flying migratory birds is carried out in an analogous way as for flying birds.

7.5.4. Determination of the number

A. Flying birds. The number of birds in flight is recorded on form M1. Individual migrants are counted accurately, simultaneously with the determination of species, sex and age. When establishing loose-type flocks ("tracks"), birds are counted accurately using one of the following two techniques:

a) counting simultaneously with species determination (by one observer);

b) a total count of the flock and a separate enumeration of the species that are less numerous (the mass species are not counted). In this case, the number of the most common species in the flock is determined by subtracting the numbers of the smaller species from the total number of the flock (applies when there is more than one observer of the OP).

When a flock is detected, a momentary estimate of the number of the flock is made and its homogeneity is determined. They are needed in case it is lost from sight and cannot be found again. If the flock flies with a planning flight, the counting is started immediately. Depending on its size, different techniques are used. Small flocks (of dozens of birds) are counted individually or in pairs (if there is not enough time). Medium flocks (of hundreds of birds) are counted in fives or tens, and large flocks (of thousands of birds) in fifties, hundreds and thousands. In the latter two cases, the abundance is calculated by initially counting a small part of the flock - 10, 50 or 100 birds, according to the size of the flock and superimposed along the length of the flock, as shown in Figure below.

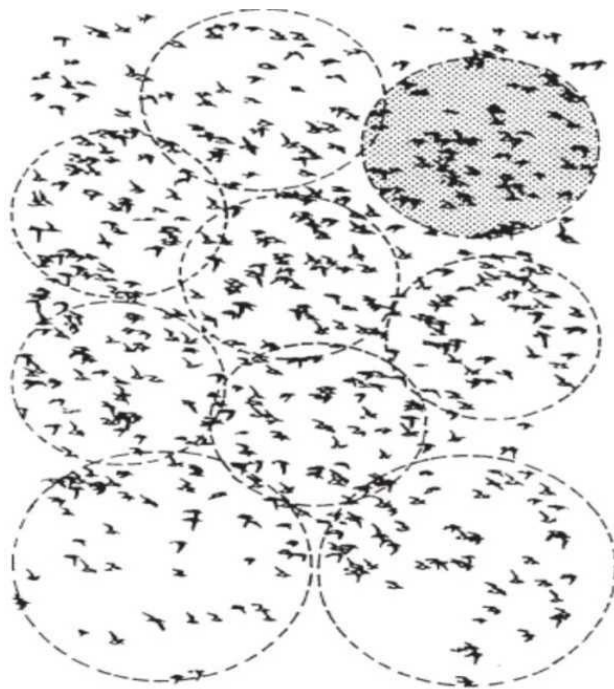


Figure 14: Counting the number of flying birds in a flock by the overlay method.

It is preferable not to use overlay slices larger than 100 birds unless the passing flock is several thousand birds and the use of a larger overlay slice is necessary to avoid losing the entire flock. If the density of the birds in the flock is too different, as it happens in white stork flocks, where the front part of the flock is denser, adjustments are made to the obtained results. In the denser parts, the initially counted length of the hundred is shortened, and in the looser parts - it is lengthened. In flocks of different density, where possible (birds fly in looser flocks), a more accurate count (tens, fives, pairs, units) is applied. In wedge-shaped flocks (mainly cranes, but also cormorants and herons), as well as in linear flocks (eg pelicans), they are counted in units, pairs, fives or tens, drawn along the length of the corresponding row. In the presence of counts by two or more observers who count simultaneously and independently, the arithmetic mean value is taken from the obtained variants. When there are more observers at one NP and recording large flocks of birds, the tasks can be divided so that one observer only records the numbers and another (or two) only counts the birds. If upon its detection the flock is flying, the observer waits for the moment when the first birds switch to a planned flight. Birds are counted when they start to leave the breeding flock. In some cases, large flocks of white storks periodically begin to soar at various points within sight of the observation point. In this case, the observer selects only one place where the birds change from soaring to planing flight and counts the birds in the flock at that place, regardless of how many "chimneys" where the birds soar formed a flock. In this way, their re-counting is avoided. In heterogeneous flocks, counting is carried out separately not only by species, but also by age and sex, if necessary. In these cases, each species and each age is counted separately. For the convenience of the observers, especially when there are not enough people on the NP, it is recommended to use a dictaphone to record all the data of the observation, and after the end of the observation, they are applied to the form.

Observers shall list all migratory waders that pass within their sight, regardless of whether identification to species has been possible.

7.5.5. The number of birds in flight is recorded on form M1.

B. Non-breeding birds. Counting of the number of non-flying migratory birds is carried out simultaneously with the determination of the species, single flying birds, and those flying in small flocks are counted to the nearest individual. When recording flying bee-eaters by sound, the sky is scanned to locate and count flying birds. Their number is recorded in form M1. The number of all non-breeding waterfowl is also recorded in form M1. Large flocks of swallows, swifts and songbirds flying over a wide front are counted using the overlay method described above. When counting the number of birds in mixed flocks of other songbirds, the dominant species in the flock is first assessed, then the entire flock is counted, simultaneously counting the number of smaller species. After that, their number is subtracted from the total number of birds in the flock and the number of the mass species is established. When part of the swallows fly hunting over the NP or move in the opposite direction of the migration, they are not reported in the form. If there are more than two observers in such cases, one of them can follow the pattern of movement of the swallows for a longer period and determine whether the "permanent" flock of hunting individuals is not actually one of gradually flying south and "replenishment" of north similar numbers of birds. In such cases, the average stay time of one individual (focal animal sampling) in the area of the OP is determined, from which the intensity

of the swallows' flight over the OP can be determined. If possible, this is also done with passages of waders or other species of songbirds flying over in a similar way.

7.5.6. Determining flight height

Flight height is determined in meters (to the nearest meter) relative to the ground surface over which the birds fly. In cases where the birds fly below the level of the OP (if it is located on a hill, and the birds fly over the valley below the hill) and it is not possible to estimate the height relative to the surface, then the vertical distance relative to the plane in which the OP lies is estimated and compared with the height of the NP in relation to the surrounding terrain above which the bird was registered and the accumulated experience is used. In a combined survey with the radar of the National Park, a calibration is made between the established height of the birds in flight, detected by the radar and detected visually at different distances from the observation point. To calibrate the individual skills, altitude determination by the kite method is applied in advance (Зехтинджиев, 2009).

Some new modifications of binoculars with a distance measuring device allow direct determination of flight height, in case the flying bird is vertically above the observer and within the range of the measuring device. When using a scaled optic (as in scopes and military binoculars), the distance is determined by the ratio of the size of the object (bird) to the scale divisions. For this purpose, the device is calibrated once with an object of a certain size. For example, a 1 m stick attached to a fence post or power line, for which the distance between the posts is known. Thus, at a certain distance (by the number of pillars), the divisions from the scale that occupy the object with the standard length of 1 m are counted. A table of the type: Correspondence of the distance to the object in [m] and the scale divisions occupied by the object is compiled.

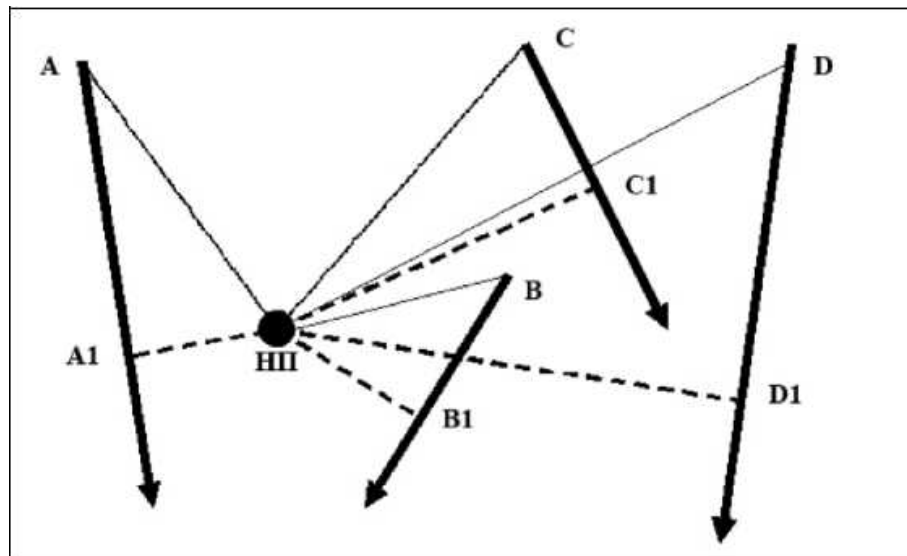
With the help of this table, the opposite task is solved - namely, determining the distance to the object, when we know the size of the object and the number of divisions it occupies on the scale. It is good to calibrate the scale for several species of birds that are representative of the individual size groups - sparrow, blackbird, pigeon, gray crow, buzzard, golden eagle. By constant practice the comparative tables are learned, and in determining the species of the bird and the scale divisions occupied, the observer can at once determine the distance with the corresponding accuracy.

The height at which the bird or flock was initially established in the field of view of the observation point and the height at which the bird was lost from sight were determined and recorded. When the bird or flock leaves the field of view at the same height, the same number is given as the starting and ending height. When the bird or flock changes altitude significantly due to soaring and gaining altitude or descending to another altitude zone, the time of the altitude change, the location of the bird and the altitude change are recorded.

In cases where the height cannot be precisely determined (mainly in the case of long-distance migrants), as well as in cases where the flight height changes within the limits of the visual field, the following division of height zones is used: 0-30 m; 31-50 m; 51 - 100 m; 101 - 150 m; 151 - 200 m; 201 - 500 m and >500 m.

Horizontal distance of the trajectories of flying flocks or single birds relative to the observation point

7.5.7. Location of the migrant/flock (Figure below).

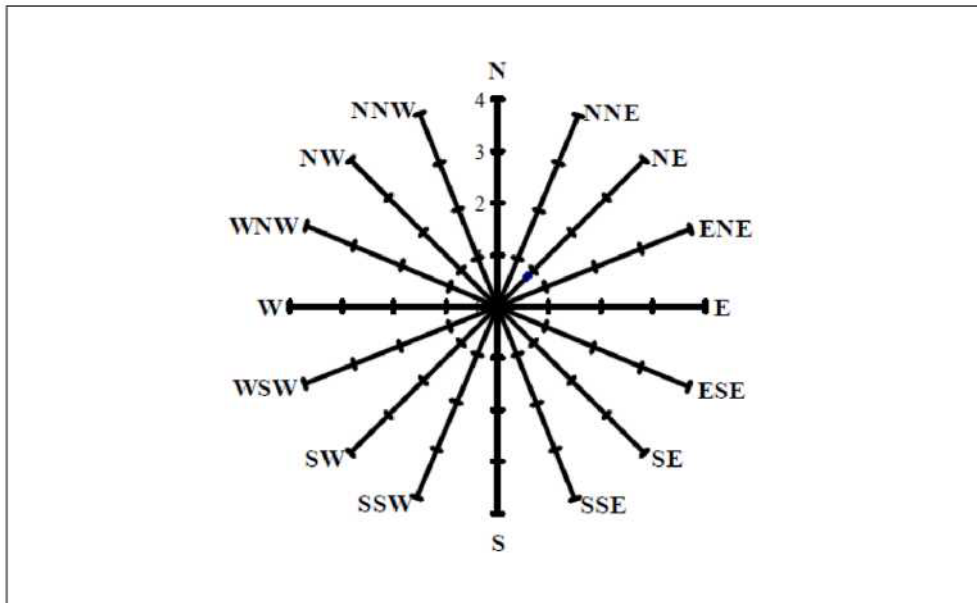


Determination of the horizontal distance (dotted lines) from the OP to a given migrant or flock (the solid thick lines) (по Мичев, Профиров, 2010)

For this purpose, pre-marked terrain landmarks are used, for which the distances from/to them are known, using the reference topographic map prepared on the basis of on-site measurements. For each individual bird or flock that has flown over, the distance from the NP is recorded individually. In the log it is noted in meters along with the direction of the world (eg 300 NW).

7.5.8. Direction of flight; flight path; type of flight

Oriented flight line (trajectory) of the migrant/flock is indicated by the geographical direction from which they arrive and the direction in which the birds depart relative to the observation point, e.g. NE -> SW, which means that the birds arrived from a northeast direction and departed in a southwest direction. When determining the geographical direction, no instrumental accuracy (measurement in degrees) will be required, instead 16 possible designations of the geographical directions will be used for their relative determination (each designation is divided by 22.5 degrees). The 16 designations adopted are as follows: N (North), NNE (North-Northeast), NE (Northeast), ENE (East-Northeast), E (East), ESE (East-Southeast), SE (Southeast), SSE (south-southeast), S (south), SSW (south-southwest), SW (southwest), WSW (west-southwest), W (west), WNW (west-northwest), NW (northwest), NNW (north-northwest) (Figure below). For each individual bird or flock that flew over, the direction of the trajectory is individually recorded.



Main and additional directions of the world used to determine the direction of flight of migrants (in the section for the direction N is marked the distance in km to the maximum limit of visual observations of 4 km (по Мичев, Профиров, 2010))

In cases where the birds change their flight direction when passing through the field of view, the trajectory is also marked with the intermediate directions, e.g. NE->SW 300W- >S. This means that the flight was from north-east to south-west, but at 300m west of the NP the birds turned and headed south.

To facilitate the determination of the direction of the trajectories, using a compass or a GPS device, clearly visible landmarks on the terrain (expressive tree, pillar, road, etc.) are marked in advance, which coincide with the main and secondary directions. It is recommended to build a marker on the ground with the geographical directions in the immediate vicinity of the observation point, marking the four intermediate (NE, SE, SW and NW) directions in addition to the four main (N, E, S and W). Stones or other available materials can be used to construct the marker.

Every time the migrant's trajectory changes, the time of the change is recorded.

The trajectories of flocks and single birds passing through the field of view of the observation point are plotted on the field map of the day's form, each trajectory being numbered. The trajectory line ends with an arrow indicating the direction of flight. Birds and flocks crossing the same trajectory are marked on the form with the same trajectory number for the day. When using the same trajectory, but in the opposite direction, the same trajectory number is entered in the form, but with a negative sign. The direction against the main direction of migration is taken as "reverse". A separate card is used for each individual field day. In intensive migration, a larger number of maps can be used so that individual trajectories do not overlap too much.

7.5.9. Type (nature) of flight.

Several types of flight are distinguished (по Симеонов, Мичев, 1991):

Active Flight (AF)

- o Rectilinear - crows, ducks, pigeons, etc.;
- o Wavy - bunting, flycatchers;
- o Diver - woodpeckers, bee-eaters;
- o Maneuverable - snipe, swifts;
- o Flickering - kestrels, buzzards, osprey, osprey, etc.;

• Passive flight

- o Glider (AI) - all flying birds;
- o Diving - eagles, falcons, hawks;
- o Falling - storks, larks, etc.

• Soaring flight (RF) - birds of prey, storks, pelicans, cranes.

Soaring birds migrate mainly by gliding flight, which is the most economical from an energetic point of view. To gain altitude, they use soaring flight, and in very rare, critical cases - falling (e.g. to avoid a collision with a flying aircraft) and active flight (to get to the thermals or to land after being blown away by the wind in the sea).

For each bird or flock observed, the nature of the flight is described using abbreviations composed of the first letters of the nature of the flight (most often AP - active flight; ДППП or ППП - direct planning or planning flight; ПП - hovering flight). The places where the birds soar are marked on the map for the day with dots and are numbered. When using the same altitude gain locations, the same point numberings are used.

7.5.10. Other behavior of migratory birds - hunting, landing/taking off during the day or at night

Any other behavior of migratory birds - hunting, landing during the day or for the night, which is not described above, is described separately in textual form. When observing raptor hunting during migration, the duration and characteristics of this behavior are described. If this is related to landing, note how many times and where the bird lands and for how long within the observation. When flocks of birds land during the day or overnight for the night, the time of landing/departure is noted, as well as the location of the birds landed.

For the registrations of migratory bird species, a Protocol is filled out, which contains the following minimum information:

MIGRATION - form M1 - standard visual survey of flying birds, waterfowl and bee-eaters									
Point/name: FEC Lambrinovo airport		Date: 29.03.2023		Begin (h/min) 8:00		End (h/min) 18:00			
наблюдатели:									
MTO	t°C	Wind (force)	Wind (direction)	Wind (m/s)	clouds kind	cloudiness%	precipitation	visibility, m	Other (descriptive notes on MTO; change in the composition of observers; reasons for closing the point)
7:00									
8:00	-2	2	W-NW		cumulus	95	92	3000	a little bit of snow
9:00	1	2	SW-W		cumulus	95	89	4000	a little bit of snow
10:00	4	2	W		cumulus	100	84	1000	a little bit of snow
11:00	7	2	W-NW		cumulus	100	70	4000	
12:00	8	1	NW		cumulus	100	60	3000	a little bit of snow
13:00	9	2	NW		cumulus	80	56	8000	
14:00	9	2	NW		cumulus	70	47	8000	
15:00	2	3	NW		cumulus	100	87	1000	havy snow
16:00	7	0	NW		cumulus	50	91	4000	
17:00	7	1	NW		cumulus	60	72	4000	
18:00	7	1	NW		cumulus	70	66	4000	

H/min	Species	Number	age/gender/phase	H (m)	distance to (.), m	Main direction	Kind of fly	The direction it's coming from	The direction it's going	Notes
8:18	F. coelebs	4	ad	15	100 N (.)	S-N	active	S	N	
8:24	B. buteo	2	ad	70	(.)	S-N	prey	S	N	
8:26	S. vulgaris	12	ad	10	50 W (.)	S-N	active	SE	NW	
8:43	M. calandra	23	ad	20	300 W (.)	SE-NW	active	SE	NW	
8:46	C. cyaneus	1	ad	20	300 W (.)	S-N	active	S	N	
8:47	F. cherrug	1	imm	50	(.)	S-N	active	S	N	
8:51	T. pilaris	17	ad	20	300 W (.)	S-N	active	S	N	
8:53	M. flava	9	ad	20	(.)	S-N	active	S	N	
8:55	F. coelebs	27	ad	15	300 W (.)	SE-NW	active	SE	NW	
8:56	C. carduelis	6	ad	20	50 N (.)	SE-NW	active	SE	NW	
9:00	Phylloscopus collybita	2	ad	10	(.)	S-N	active	S	N	
9:26	C. corone	15	ad	100	600 E (.)	S-N	active	S	N	
10:20	C. palumbus	21	ad	50	400 S (.)	SE-NW	active	SE	NW	
10:27	C. cyaneus	1	ad	30	100 W (.)	S-N	prey	S	N	
10:28	M. calandra	9	ad	30	300 E (.)	S-N	active	S	N	
10:30	M. calandra	12	ad	30	100 W (.)	S-N	active	S	N	
10:34	B. buteo	1	ad	30	600 E (.)	S-N	prey	S	N	
10:38	C. carduelis	34	ad	50	(.)	S-N	active	S	N	
11:21	G. cristata	22	ad	30	100 W (.)	S-N	active	S	N	

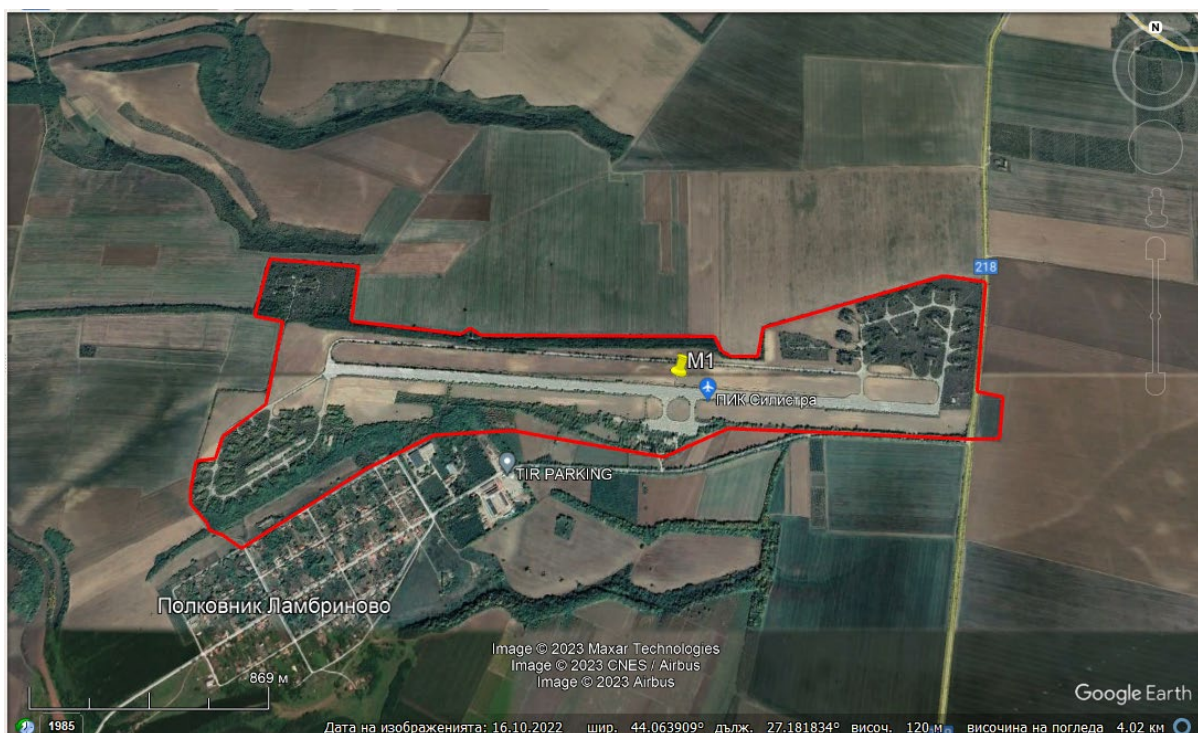
For example, one observation point was determined - M1 - 44.055134°, 27.182238°, which is located in the almost ideal centroid of the airport and is equally distant from the eastern (1320 m) and western (1640 m) ends of the future FPP. It is located at one of the highest points relative to the terrain - 122 m above sea level.

This section is based on the results and findings of the in-flight monitoring that was carried out in the spring season – March-October 2023

7.5.11. Breeding birds in the PP area

Approaches for determining transects, points, observation sites, etc. Equipment.

Practically the entire territory of the PP is suitable for carrying out linear transects for mapping passerine birds (Passeriformes). Their length can vary depending on the target species between 500m and 3000m, rarely more. The length of the transect is determined with a GPS device. The start and end point of each transect must be marked. Within the available habitats of a given species in the quadrat, the selection of the starting point of the transects is random, observing the rule that in forest and scrub habitats the smallest distance between the routes (tracks) of two adjacent transects cannot be more less than 300 m except when the transects are in opposite directions from a common starting point or when they are in completely different habitats and the start of the second transect (in a different habitat) is close to the end of the previous transect. In these cases, the distance between the routes (tracks) can be less than 200m. In forest habitats, the age of the forest, as represented for some of the species, should be taken into account for the selection of transects. In target habitats, "forest" should be followed, even though the road (trail) may enter open habitats and vice versa. If there is still a temporary and small change in the main habitat type along the transect route, this is marked with a GPS point. It is marked on Field Form #1 for transects in the columns for "forest habitat" and "open habitat", where the first column is for GPS points. If the place is not reached, it is marked in the "Notes" column at the end of the form. The best option for randomly selecting the starting points of the transects.



The speed of movement along the transects should be standardized at about 2km/h. Significant deviations from this requirement should not be allowed, because the results of subsequent counting will not be comparable. When conducting all types of transects, the GPS device is kept constantly on to record a track! When moving between individual transects or points, the GPS device can also be turned off to save batteries. All transects must be carried out in passable sections that do not create excessive difficulties or dangers to the life and health of the experts, so that they can be repeated in the same way in a subsequent count.

7.5.12. Monitoring parameters

In each square, all established bird individuals are recorded, regardless of which species and group they are - target species or not. For each observation, the species of the bird, the number of individuals found (number seen and number heard), the distance relative to the transect line or the observer in intervals 0-50m and over 50m for forest and bush habitats are recorded; 0-100m and over 100m for open habitats. In the column "number of individuals heard" only those birds that were heard but not seen are recorded. Those singing birds that are heard and seen must be noted in the column "number of individuals seen". Geographic coordinates are recorded on the field forms for each observed species within the transect or observation point. The habitat is described in detail at each transect or stationary point. After determining the type of habitat (forest, open, water, rocky), all the individual parameters of the forest and open habitats, which are noted in the forms, are determined. For forest habitats, these are - type of forest, dominant species, accompanying tree species, age of the forest, composition, presence of logging, presence of undergrowth. For open habitats, these are: type, presence of stones in %, swamping, presence of grazing and mowing. For each transect, in addition to points with coordinates, at least 1 photograph of each habitat should be taken to document the condition/quality of the habitat. Where species threats and/or habitat disturbances are identified, coordinates are also recorded and photographs are taken, and identified threats are detailed on the field form. At the end of the reading of the square, the total established number of pairs of each species is filled in. Nest Found Field Forms are completed for all nests found, regardless of bird group. Field forms are completed only for nests for which it can be determined which bird species they are. Coordinates of each established nest are also recorded, as well as data on the substrate on which it is located. The number of eggs or young, the number of adult birds in or around the nest is also noted.



Figure 15: Members of the monitoring team, photo from PP area

Essential equipment for every field expert

Each field expert should be equipped with binoculars, a spotting scope, a GPS device, a camera, a caliper, a line, boots, and, if necessary, sound recording and sound-producing devices.

Field form

Annex_No1 field form_line and points transects - nesting birds EN - Excel

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Annex 1

Field form No1 for line and point transects for bird monitoring

Main data

Date:	Time begin	UTM	Town	Municipality	District	Institution (RIOSV / DNP / DFP)
	Time end					
N2000 site for birds:	N2000 site for habitats:	Rammar place	Protected areas	State Forestry	State hunting farm	Altitude, m

Weather condition

T °C	Cloudiness (0 to 11)	Wind direction	Wind strength (no wind, weak, moderate, strong, variable, hurricane)	Precipitation Type of precipitation (rain, snow)	Precipitation strength (drizzle, light, moderate, heavy)
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Team and position of the participants:

1	3
2	4

Occurrence on transect

Transect No/name	GPS coordinates	Name of	N	E	Transect length in m (km)
No.	Start point				
	End point				

Sheet1

Annex_No1 field form_line and points transects - nesting birds EN - Excel

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Habitat characterization for one transect

Type of habitat	Coastal and halophytic habitats	Coastal and continental dunes	Freshwater habitats: ericoid scrub	Temperate continental ericoid scrub	Natural and semi-natural grass formations	Waterlogged bog, mudflats and bogs	Rock habitats and caves	Forests	Other habitats
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Forest habitat type

GPS observation point/ geographic coordinates:	Type of forest (deciduous, coniferous, mixed)	Dominant species:	Accompanying tree species:	Age	Exhibition	Existence of cuttings (yes/no)	Presence of undergrowth (yes/no)
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Open habitats:

Name of GPS observation point/ geographic coordinates:	Type (meadow, grassland, steppe, dune, field, etc)	Presence of stones and other areas without soil layer:	Sampling (yes / no)	Presence of grazing (light / moderate / strong)	Mowing (yes / no)
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Bird sightings:

Species/latin name	Time h:min	GPS observation point	Number of individuals seen	Number of individuals heard	Total number (number of birds seen + moderate)	Number of established pairs (expert estimate)	Distance from the observer (indicated by Forest: 0-50m, 50-100m, 100-150m, 150-200m; Open habitats: 0-50m, 50-100m, 100-150m, 150-200m)	Degree of confidence of nesting (from 1 to 3)
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Sheet1

7.6. 9.1.2. Results

7.6.1. Migration – Spring

Total number of registered migratory bird species:

Table 5: Target Species to be recorded by Flight Activity Surveys (MARCH-MAY 2023 - MIGRATORY BIRDS)

№	<i>Species</i>	Number
1.	<i>Acc. gentilis</i>	2
2.	<i>Acc. nisus</i>	4
3.	<i>Actitis hypoleucos</i>	1
4.	<i>Aegithalos caudatus</i>	1
5.	<i>An. campestris</i>	1
6.	<i>Anas platyrhynchos</i>	5
7.	<i>Apus apus</i>	19
8.	<i>Apus melba</i>	16
9.	<i>Aq. pomarina</i>	26
10.	<i>Ar. cinerea</i>	5
11.	<i>B. buteo</i>	41
12.	<i>C. aeruginosus</i>	1
13.	<i>C. carduelis</i>	40
14.	<i>C. ciconia</i>	1140
15.	<i>C. corone</i>	15
16.	<i>C. cyaneus</i>	2
17.	<i>C. frugilegus</i>	121
18.	<i>C. garullus</i>	2
19.	<i>C. monedula</i>	3

20.	<i>C. nigra</i>	2
21.	<i>C. olor</i>	8
22.	<i>C. palumbus</i>	42
23.	<i>C. pygargus</i>	1
24.	<i>D. urbicum</i>	94
25.	<i>F. cherrug</i>	1
26.	<i>F. coelebs</i>	67
27.	<i>F. peregrinus</i>	1
28.	<i>F. tinunculus</i>	3
29.	<i>F. vespertinus</i>	8
30.	<i>G. cristata</i>	22
31.	<i>H. albicilla</i>	1
32.	<i>H. rustica</i>	48
33.	<i>Hieraaetus pennatus</i>	1
34.	<i>L. collurio</i>	1
35.	<i>M. alba</i>	231
36.	<i>M. apiaster</i>	219
37.	<i>M. calandra</i>	55
38.	<i>M. flava</i>	21
39.	<i>P. apivorus</i>	4
40.	<i>P. haliaetus</i>	1
41.	<i>P. montanus</i>	4
42.	<i>P. onocrotalus</i>	2
43.	<i>Pandion haliaetus</i>	1

44.	<i>Ph. carbo</i>	4
45.	<i>Ph. ochrurus</i>	2
46.	<i>Phylloscopus collybita</i>	2
47.	<i>Platalea leucorodia</i>	1
48.	<i>R. riparia</i>	103
49.	<i>S. vulgaris</i>	40
50.	<i>St. turtur</i>	11
51.	<i>St. vulgaris</i>	16
52.	<i>T. pilaris</i>	17
53.	<i>Tad. ferruginea</i>	3
54.	<i>Tringa sp.</i>	7
55.	<i>Up. epopps</i>	4
56.	<i>B. buteo/P. apivorus</i>	7

A number of 56 species of birds have been identified, the majority of which fly at an average height of 200-600 meters and maintain the direction South-North in 92% of cases, and about 5% Southeast-Northwest and 3% Southwest-Northeast.

Observations from fixed vantage points were used to record the number and behavior of diurnal soaring birds over the site, mainly of migratory soaring birds as well as resident soaring birds. Observation equipment (binoculars, spotting scopes, rangefinder, etc.), DSLR cameras (Canon 90 D, 100-400 mm lens, Canon 90 D, with 70-300 mm lens, Nikon D610, 200-500 mm lens) and receiver equipment were used during field trips. GPS (Garmin 66s, garmin 67) for tracking and recording the route, and thermometer.



Figure 16: Members of the team, vantage point photo from PP area

Table 6: Table: Level of effort of in-flight monitoring assessments per season

Spring season	Number of hours per vantage point	Total number of hours covered during season (Vantage <u>Points</u>)
30-31.03.2023	10	20
18-21.04.2023	10	40
11-14.05.2023	8	32
	28	92

Description of the Vantage Point position - Explain the criterias for establishing the number and position of Vantage point (for example range of coverage, etc.).

Map with the locations of VPs and the coverage area – 180 degrees arc).- in progress

One observation point was determined - M1 - 44.055134°, 27.182238°, which is located in the almost ideal centroid of the airport and is equally distant from the eastern (1320 m) and western (1640 m) ends of the future FPP. It is located at one of the highest points relative to the terrain - 122 m above sea level.



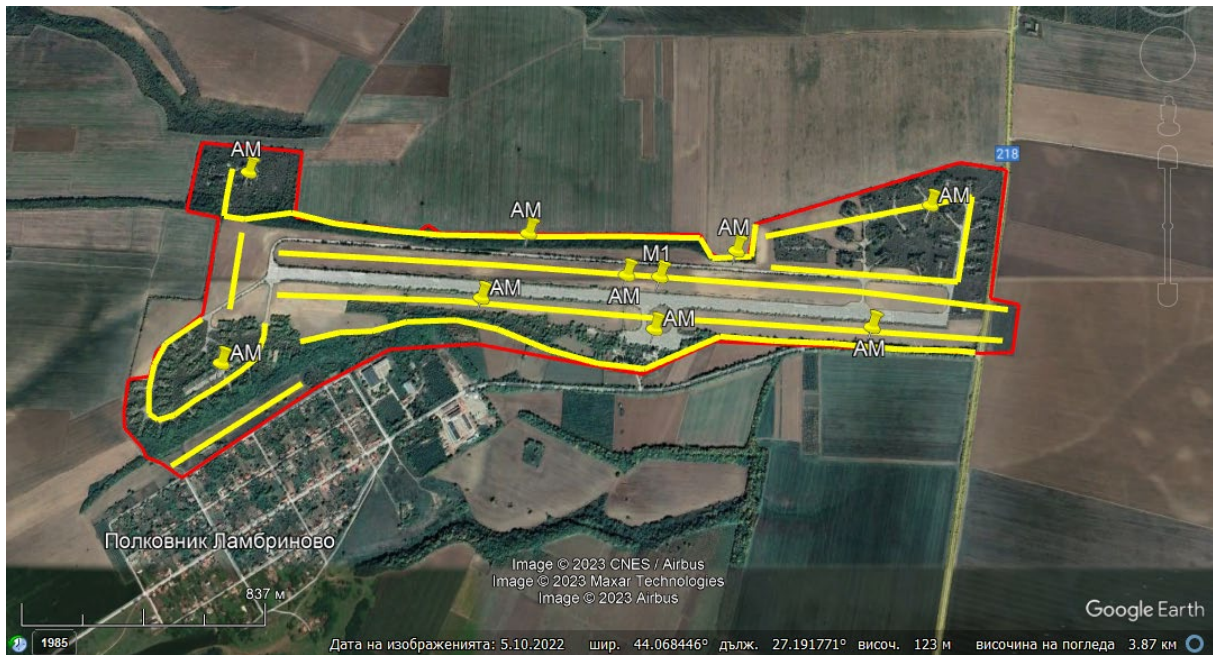
A spotting scope was used when required to aid species identification – if it was used

Description of method, for example:

- The bird's flight height above ground level is estimated at the point of first detection and thereafter at 15-second intervals, with the aid of a count-down interval timer with an audible alarm.

During the migration observations, numerous activities were carried out within the study area, which significantly altered and damaged the available habitats of the species.

As of March 2023, surveys are planned for the end of May 2023 for the nesting bird species in the study area, namely:



As 8 routes are planned, which cover previously identified different types of habitats:

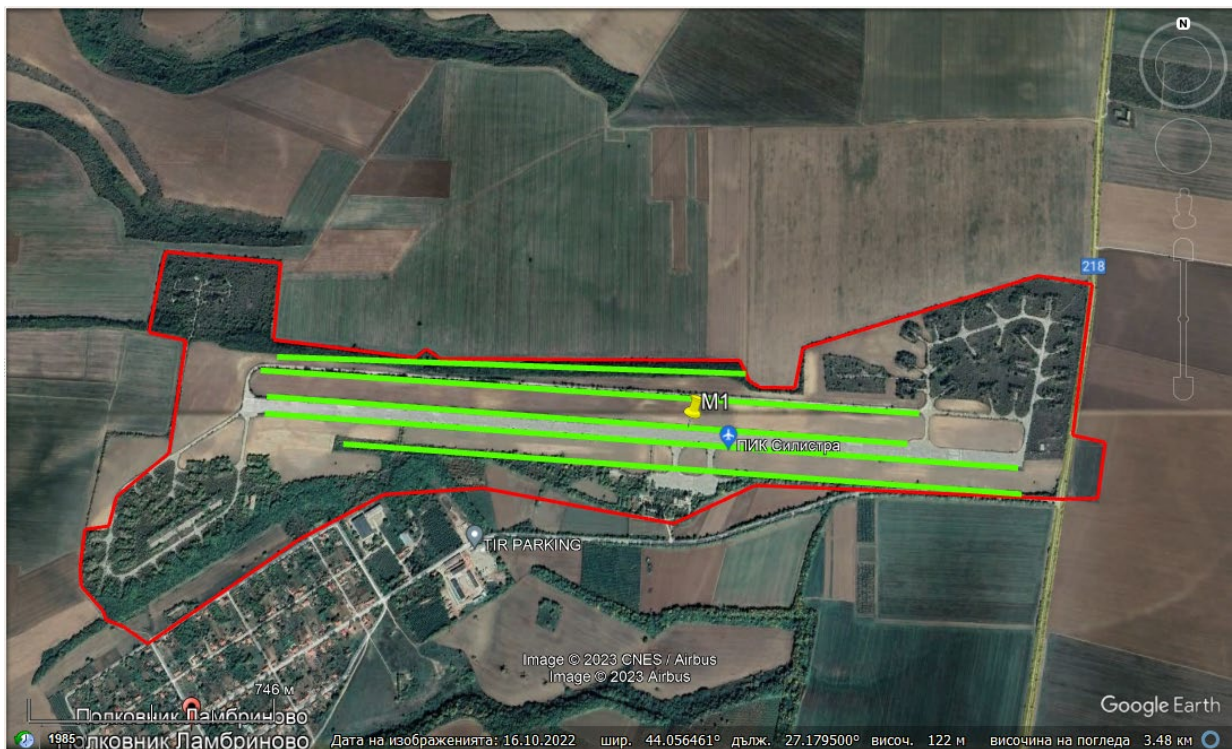
1. Forests - acacia, beech, elm and oak
2. Arable fields
3. Open spaces resembling pastures

Ultimately, these habitats are significantly altered and the distribution for monitoring breeding birds is altered.

The territory of the power plant is partially used by migratory birds, as a place to rest and even search for food, in which the arable areas included in the landfills intended for the construction of the power plant, as well as the vegetation - trees and bushes on their periphery, are preferred:



Cultivable areas - fields, as resting and foraging areas



Strips of trees and bushes, as places mainly for rest

Tree vegetation has remained immediately next to the fence of the territory planned for the construction of the solar plant.



Figure 17: Tree and shrub vegetation around the track – March 2023.



Figure 18: Tree and shrub vegetation around the track – April 2023.



Figure 19: Missing tree and shrub vegetation around the track – May 2023.



Figure 20: Beginning of felling of tree and shrub vegetation along the northern and southern borders of the airport – March-April 2023.



Figure 21: Final removal of tree and shrub vegetation along northern and southern airport boundaries, buffer strips and self-established vegetation around the airport runway – May 2023.

During the spring monitoring of 2023, 55 species of birds were recorded.

The area is not a typical bird migration corridor, but is located on the periphery of the Via Pontica migration route.

Western-Black Sea Flyway Via Pontica -
https://natura2000.egov.bg/PublicDownloads/Auto/OtherDoc/276296/276296_Birds_120.pdf and
https://natura2000.egov.bg/PublicDownloads/Auto/OtherDoc/276297/276297_Birds_120.pdf

The main migration route passing through the country is the Western Black Sea Flyway Via Pontica (one of the two largest migration routes in Europe). It runs along the Black Sea coast and its most intense part is up to 100 km wide inland. Millions of water-loving, raptors, warblers and songbirds of over 110 species fly over it every year in spring and autumn. As a result of the studies carried out so far, it has been established that over 620,000 flying birds (storks, pelicans, birds of prey and cranes) pass along the Via Pontica, and along the migration route they have permanent places to rest and spend the night.

Usually, birds of prey pass in small numbers and at a very high altitude between 200 to over 800 meters high. This applies to established species:

1. *Acc. gentilis*
2. *Acc. nisus*
3. *Aq. pomarina*
4. *B. buteo*
5. *F. peregrinus*
6. *Hieraaetus pennatus*
7. *P. apivorus*
8. *P. haliaetus*

As there is a significant difference in the number of individuals recorded between the spring and autumn migration (there is still 2 months to study - October and November 2023 and the team do not have final results yet, but the data from September 2023 that was summarized shows that the autumn migration of *Aq. pomarina* over the territory of the investment proposal is significantly more enhanced and numerous, but it can be taken into account that this can be due to specific weather conditions: West wind that pushes the birds further east towards the Black Sea, anti-cyclonic weather without wind and high temperatures, etc., i.e. to make a definite conclusion, we need to have data from at least 3-4 seasons of full-scale surveys from August 10 to October 31 to make some general conclusion). The most numerous in the spring are *Buteo buteo* (3-4 days of trials) – 41 individuals, followed by *Aq. pomarina* – 26 individuals, etc.

Regarding the birds of prey, it can be determined that the territory falls in corridors that are located on the periphery of the main road Via Pontica and therefore the numbers are very low and it depends on the specific weather conditions. But the birds of this mentioned group pass high above the territory and do not use its area as a place to rest and search for food.

For the species *H. albicilla*, we consider that it only performs feeding migrations, since this species nests on an island in the Danube River near the Srebarna Reserve, about 6-10 km by air from the project area.

In the species of predators from those that pass relatively low on the ground – 20-100 meters above the ground are the group of:

1. *C. aeruginosus*
2. *C. cyaneus*
3. *C. pygargus*
4. *F. cherrug*
5. *F. tinunculus*
6. *F. vespertinus*
7. *Pandion haliaetus*

From this group, the species *F. tinunculus* (3 individuals) and *F. vespertinus* (8 individuals) are the most numerous, and these two species are observed to be using the territory of the investment proposal to search for food, rest and even spend the night for individual individuals.

In the case of the species *C. ciconia* (with 1140 recorded individuals during the spring migration) they fly at a height of about 100-400 meters and from our observations it was established that the birds do not use the territory as a place to rest and search for food. According to the security of the site, on 15/04/2023, about 150 individuals of the *Ciconia ciconia* species spent the night at the north-eastern end of the airport.

For all other 37 established species:

Table 7: MARCH-MAY 2023 - MIGRATORY BIRDS

№	Species	Number	IUCN Red List of Threatened Species
1.	<i>Actitis hypoleucos</i>	1	LC
2.	<i>Aegithalos caudatus</i>	1	LC
3.	<i>An. campestris</i>	1	LC
4.	<i>Anas platyrhynchos</i>	5	LC
5.	<i>Apus apus</i>	19	LC

6.	<i>Apus melba</i>	16	LC
7.	<i>Ar. cinerea</i>	5	LC
8.	<i>C. carduelis</i>	40	LC
9.	<i>C. corone</i>	15	LC
10.	<i>C. frugilegus</i>	121	LC
11.	<i>C. garullus</i>	2	LC
12.	<i>C. monedula</i>	3	LC
13.	<i>C. nigra</i>	2	LC (2016)/MD (2021)
14.	<i>C. olor</i>	8	LC
15.	<i>C. palumbus</i>	42	LC
16.	<i>D. urbicum</i>	94	LC
17.	<i>F. coelebs</i>	67	LC
18.	<i>G. cristata</i>	22	LC
19.	<i>H. rustica</i>	48	LC
20.	<i>L. collurio</i>	1	LC
21.	<i>M. alba</i>	231	LC
22.	<i>M. apiaster</i>	219	LC
23.	<i>M. calandra</i>	55	LC
24.	<i>M. flava</i>	21	LC
25.	<i>P. montanus</i>	4	LC
26.	<i>P. onocrotalus</i>	2	LC
27.	<i>Ph. carbo</i>	4	LC
28.	<i>Ph. ochrurus</i>	2	LC
29.	<i>Phylloscopus collybita</i>	2	LC

30.	<i>Platalea leucorodia</i>	1	LC
31.	<i>R. riparia</i>	103	LC
32.	<i>S. vulgaris</i>	40	LC
33.	<i>St. turtur</i>	11	LC
34.	<i>St. vulgaris</i>	16	LC
35.	<i>T. pilaris</i>	17	LC
36.	<i>Tad. ferruginea</i>	3	LC
37.	<i>Up. epopps</i>	4	LC

Of these, only in the species:

1. *Actitis hypoleucos*
2. *Aegithalos caudatus*
3. *An. campestris*
4. *C. carduelis*
5. *C. palumbus*
6. *D. urbicum*
7. *F. coelebs*
8. *G. cristata*
9. *H. rustica*
10. *L. collurio*
11. *M. alba*
12. *M. apiaster*
13. *M. calandra*
14. *M. flava*
15. *P. montanus*

16. *Ph. ochrurus*

17. *Phylloscopus collybita*

18. *R. riparia*

19. *St. turtur*

20. *St. vulgaris*

21. *Up. Epopps*



Figure 22: Buteo buteo – Eurasian Buzzard (SCBIM AON original photo)



Figure 23: Pandion haliaetus – Uligan pescar (SCBIM AON original photo)



Figure 24: Ciconia ciconia - White stork gull (SCBIM AON original photo)



Figure 25 Larus cachinnans - Caspian (SCBIM AON original photo)



Figure 26: *Pica pica* – Magpie (SCBIM AON original photo)

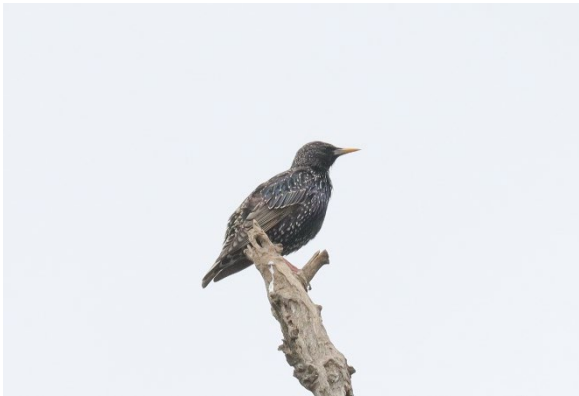


Figure 27: *Sturnus vulgaris* - European starling
cuckoo (SCBIM AON original photo)



Figure 28: *Cuculus canorus* - Common
SCBIM AON original photo



Figure 29: *Phasianus colchicus* - Common pheasant
blackbird (SCBIM AON original photo)



Figure 30: *Turdus merula* - Eurasian
blackbird (SCBIM AON original photo)



Figure 31: *Dendrocopus syriacus* – Syrian woodpecker
palumbus – Wood pigeon (SCBIM AON original photo)



Figure 32: *Columba*
SCBIM AON



Figure 33: *Cyanistes caeruleus* - Eurasian blue tit
(SCBIM AON original photo)



Figure 34: *Parus major* - Great tit
(SCBIM AON original photo)



Figure 35: *Motacilla alba* - White wagtail
(Photo SCBIM AON)



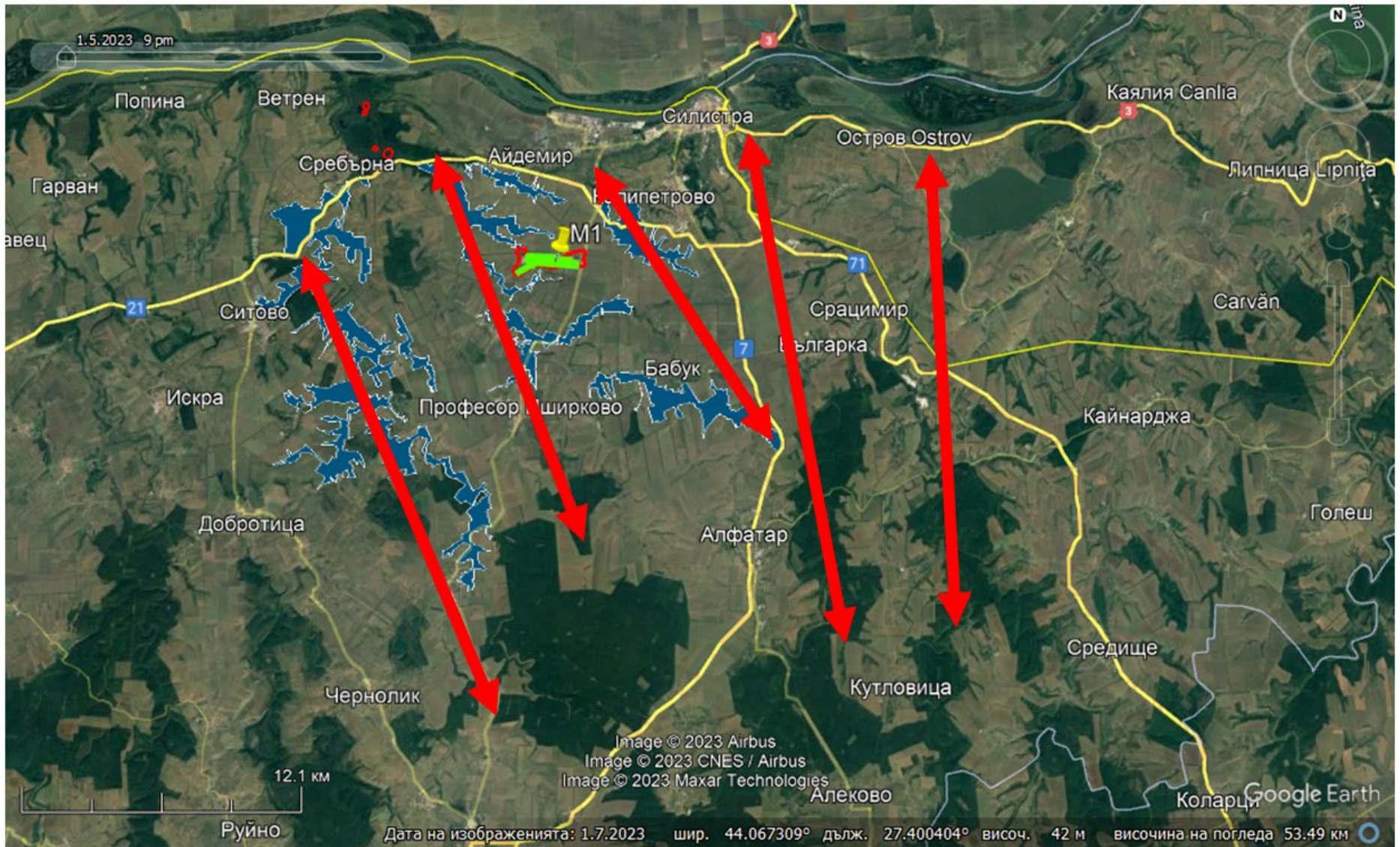
Figure 36: *Motacilla flava* - Western yellow
(Photo SCBIM AON)

Single specimens have been found that use the territory to search for food and rarely use them as short-term resting places.

For the group of waterfowl, the described terrains are not attractive either for searching for food or as places to rest and spend the night, but it was a registration of *Actitis hypoleucos* on the track in the month of April 2023.

Due to the stated facts and evidence, it can be considered that the territory is not of essential importance for the migration of the established 50-56 species of birds. Only *C. ciconia* can be determined to be in an important place of the common migration route for the species along the Via Pontica route. The surrounding agricultural lands and especially around the land that is outlined in the area are of greater importance, since there they find warm currents (thermals) that allow them to gain height on the one hand, and to use the surrounding arable lands as resting places /night and looking for food.

Possible such areas of lands:



AUTUMN (in progress)

Total number of registered migratory bird species:

Table 8: Target Species to be recorded by Flight Activity Surveys

№	Species	Number
1.	<i>A. apus</i>	78
2.	<i>Al. arvensis</i>	48
3.	<i>Acc. brevipes</i>	2
4.	<i>Aq. pomarina</i>	89
5.	<i>An. campestris</i>	6
6.	<i>Ap. melba</i>	2
7.	<i>B. buteo</i>	68
8.	<i>B. rufinus</i>	1
9.	<i>C. aeruginosus</i>	1
10.	<i>C. carduelis</i>	73
11.	<i>C. ciconia</i>	1041
12.	<i>C. coccythraustes</i>	2
13.	<i>C. cyaneus</i>	1
14.	<i>Corvus frugilegus</i>	1
15.	<i>Corvus monedula</i>	14
16.	<i>C. nigra</i>	1
17.	<i>C. palumbus</i>	5
18.	<i>D. urbicum</i>	1455
19.	<i>F. coelebs</i>	155
20.	<i>F. tinnunculus</i>	1
21.	<i>F. vespertinus</i>	6

22.	<i>G. cristata</i>	81
23.	<i>M. alba</i>	2
24.	<i>M. apiasater</i>	1593
25.	<i>M. calandra</i>	33
26.	<i>M. flava</i>	9
27.	<i>M. migrans</i>	1
28.	<i>M. milvus</i>	1
29.	<i>O. oriolus</i>	6
30.	<i>P. apivorus</i>	62
31.	<i>P. columbus</i>	2
32.	<i>P. major</i>	14
33.	<i>P. montanus</i>	82
34.	<i>S. spinus</i>	319
35.	<i>S. turtur</i>	7
36.	<i>S. vulgaris</i>	340

36 species of birds have been identified, the majority of which fly at an average height of 200-600 meters and maintain the direction South-North in 98% of cases, and about 1% Southeast-Northwest and 1% Southwest-Northeast.

A total of 5,602 individuals of all found species were recorded through August-September 2023 observations. The highest recorded species in the study were *C. ciconia* - 1041 individuals, *D. urbicum* - 1455 individuals and *M. apiasater* - 1593 individuals. These species only fly over the territory without using it.

Birds of prey fly relatively high between 100 to 600 meters high and do not use the territory. In general, migratory bird species do not use the territory permanently. Mostly songbirds resting or looking for food - Passeriformes, and from the predatory *F. vespertinus*, roosts in the trees at the northern and southern border of the airport, where trees are available. 1 individual of the species *Acc* was observed. *nisus*, which was found to be trying to hunt Passeriformes birds during migration.

Compared to the spring migration, in which 55 species were recorded and significantly lower numbers of individuals, in autumn 2023(in progress), although there was a significant reduction in possible habitats that could be used by migrating birds, such as resting places, sought after of food and lodging, which have changed as a result of the activities of cleaning the territory from unwanted forest, shrub and grass vegetation, there is actually even an increase in the number of individuals of some species. During guided observations, species from the group of Passeriformes actively use the territory as a place to rest and search for food: Al. Arvensis, An. Campestris, C. carduelis, G. cristata, P. montanus and S. spinus, and from the predatory F. tinnunculus, Acc. nisus and F. vespertinus, roosts in the trees at the northern and southern borders of the airport, where trees are available, which are on the borders of the area intended for the construction of the PP.

Observations from fixed vantage points were used to record the number and behavior of diurnal soaring birds over the site, mainly of migratory soaring birds as well as resident soaring birds. Equipment required for this method includes binoculars, telescope, stop watch, GPS and thermometer.

Table 9: Level of effort of in-flight monitoring assessments per season

Season autumn (In progress)	Number of hours per vantage point	Total number of hours covered during season (Vantage Points)
16-18.08.2023	8	24
19-22.09.2023	8	24
23-26.10.2023	8	24
	32	72

Description of the Vantage Point position - Explain the criterias for establishing the number and position of Vantage point (for example range of coverage, etc.). One of observations points was determined - M1 - 44.055134°, 27.182238°, which is located in the almost ideal centroid of the airport and is equally distant from the eastern (1320 m) and western (1640 m) ends of the future PP. It is located at one of the highest points relative to the terrain - 122 m above sea level.

7.6.2. Autumn monitoring (in progress)

No special habitats have been identified for migratory birds. Only in the group of Passeriformes: Al. arvensis, An. campestris, C. carduelis, G. cristata, P. montanus and S. spinus episodically use the territory of the future FEC for rest and foraging - the arable fields, and from the predatory F. tinnunculus, Acc. nisus and F. vespertinus, roosts in the trees at the northern and southern borders of the airport, where trees are available, which are on the borders of the area intended for the construction of the HPP.

Important habitats of the species will not be affected, as the same are also available in the adjacent cultivated areas and tree belts.

7.6.3. Breeding season

Table 10: *Breeding species recorded in the survey*

№	Species	Number, pairs	IUCN Red List of Threatened Species	National legislation Biodiversity Act, Annex 3
1.	<i>A. arvensis</i>	8	LC	+
2.	<i>C. canorus</i>	2	LC	+
3.	<i>C. palumbus</i>	5	LC	+
4.	<i>D. syriacus</i>	3	LC	+
5.	<i>E. rubecula</i>	3	LC	+
6.	<i>Em. hortulana</i>	4	LC	+
7.	<i>F. coelebs</i>	2	LC	+
8.	<i>G. cristata</i>	7	LC	+
9.	<i>G. glandarius</i>	3	LC	-
10.	<i>Jynx torquilla</i>	1	LC	+
11.	<i>L. collurio</i>	18	LC	+
12.	<i>Luscinia megarhynchos</i>	21	LC	+
13.	<i>M. flava</i>	11	LC	+
14.	<i>M. calandra</i>	17	LC	+
15.	<i>M. striata</i>	1	LC	+
16.	<i>O. oriolus</i>	9	LC	+
17.	<i>P. caeruleus</i>	3	LC	+
18.	<i>P. major</i>	8	LC	+
19.	<i>P. pica</i>	1	LC	-

20.	<i>Ph. colchicus</i>	3	LC	-
21.	<i>S. atricapilla</i>	1	LC	+
22.	<i>S. communis</i>	3	LC	+
23.	<i>S. decaocto</i>	1	LC	-
24.	<i>S. turtur</i>	7	LC	-
25.	<i>S. vulgaris</i>	18	LC	-
26.	<i>T. merula</i>	4	LC	+

<https://www.birdlife.org/wp-content/uploads/2022/05/BirdLife-European-Red-List-of-Birds-2021.pdf.pdf>

During the nights dedicated to bat research, the following nocturnal birds of prey - Strigiformes - were also identified by sound, namely:

1. *Asio otus* – 2 pairs
2. *Athene noctua* – 2 pairs
3. *Otus scops* – 2 pairs
4. *Tyto alba* – 1 pair (this species was observed foraging at point M1 – the migration monitoring point)

As for the nocturnal active birds, we should also mention the species - European Nightjar (*Caprimulgus europaeus*), which was registered by sound and its nesting number can be determined at 2-3 pairs.

Total species of nesting birds found: 31 species.

Table 11: Period June-July 2023 – breeding birds

№	Species	Number, pairs	IUCN Red List of Threatened Species	National legislation Biodiversity Act, Annex 3
1.	<i>A. arvensis</i>	2	LC	+
2.	<i>C. canorus</i>	1	LC	+

3.	<i>C. palumbus</i>	3	LC	+
4.	<i>D. syriacus</i>	1	LC	+
5.	<i>E. rubecula</i>	1	LC	+
6.	<i>F. coelebs</i>	1	LC	+
7.	<i>G. cristata</i>	2	LC	+
8.	<i>G. glandarius</i>	1	LC	-
9.	<i>L. collurio</i>	5	LC	+
10.	<i>Luscinia megarhynchos</i>	4	LC	+
11.	<i>M. calandra</i>	2	LC	+
12.	<i>O. oriolus</i>	3	LC	+
13.	<i>P. caeruleus</i>	1	LC	+
14.	<i>P. major</i>	3	LC	+
15.	<i>P. pica</i>	1	LC	-
16.	<i>Ph. colchicus</i>	1	LC	-
17.	<i>S. atricapilla</i>	1	LC	+
18.	<i>S. communis</i>	1	LC	+
19.	<i>S. decaocto</i>	1	LC	-
20.	<i>S. turtur</i>	2	LC	-
21.	<i>S. vulgaris</i>	5	LC	-
22.	<i>T. merula</i>	2	LC	+

<https://www.birdlife.org/wp-content/uploads/2022/05/BirdLife-European-Red-List-of-Birds-2021.pdf.pdf>

Total reduce of pair, a species from 31 to 26.

During the nights dedicated to bat research, the following nocturnal birds of prey - Strigiformes - were also identified by sound, namely:

1. *Asio otus* – 1 pairs
2. *Athene noctua* – 1 pairs
3. *Otus scops* – 1 pairs
4. *Tyto alba* – 1 pair (this species was observed foraging at point M1 – the migration monitoring point)

This significant difference in the species composition (number of species) and the established pairs of the respective species is due to the comprehensive treatment of the arable fields in mid-June 2023 - complete removal of the grass vegetation. This led to the extinction of some species such as:

Table 12: Data from breeding period – June 2023

№	Species	Number, pairs
1.	<i>Em. hortulana</i>	4
2.	<i>Jynx torquilla</i>	1
3.	<i>M. flava</i>	11
4.	<i>M. striata</i>	1
5.	<i>Caprimulgus europaeus</i>	2

Within the framework of the studies, it was established that the species that have retained their status as nesting species in the open spaces - the arable fields, such as:

1. *Al. arvensis*
2. *G. cristata*
3. *L. Collurio*
4. *Ph. colchicus*
5. *M. calandra*,

Some have moved to the ecotone zone in the northern and southern parts of the FEC area, where strips of trees mainly of acacia are available and the number of established pairs is clearly reduced, in some species by 50%.

During the felling of strips of trees in the territory for the FEC, some species are also affected, such as:

1. *C. canorus*
2. *C. palumbus*
3. *D. syriacus*
4. *E. rubecula*
5. *F. coelebs*
6. *G. glandarius*
7. *Luscinia megarhynchos*
8. *O. oriolus*
9. *Cy. caeruleus*
10. *P. major*
11. *P. pica*
12. *S. atricapilla*
13. *Cu. communis*
14. *S. decaocto*
15. *S. turtur*
16. *S. vulgaris*
17. *T. merula*

In nocturnal birds of prey, the species composition has not changed, but the number of pairs has been partially reduced by half.

1. *Asio otus*
2. *Athene noctua*
3. *Otus scops*

Despite the changes in nesting and foraging habitats, the species composition is generally maintained, thanks to available areas north and south of the FEC site boundaries, where arable land and tree strips (mainly acacia) are also available.

7.7. BATS

Bats are one of the most widespread mammals on Earth. They are found on all continents except Antarctica. About 1110 species are known in the world, divided into two large groups - insectivorous (Microchiroptera) and fruit-eating bats (Megachiroptera).

- Insectivores (about 930 species) are found everywhere on land and are an important natural regulator of the numbers of insects, which are their main food.
- Fruit eaters (about 180 species) live in the tropics and feed mainly on fruits and seeds. They have a significant role in pollination and seed dispersal. Bat species diversity is highest in the tropics and decreases northward. Bulgaria has a uniquely high diversity of bats. Of the 35 species established within the continent, 33 species are known in our country. Among the reasons for this high species diversity are our transitional geographical position, the mosaic of diverse habitats starting from sea level and reaching over 2900 m, the presence of still preserved sites in many parts of the country, extensive agriculture in mountainous and semi-mountainous areas, the presence of over 5,400 caves and the rich diversity and abundance of insects. Bat diversity is highest in the zone from 100 to 400 m, where 17–20 species live in relatively small areas.

There are specific steps of actions that must be followed in order to correctly implement an assessment within the territorial limits of an investment proposal (IP):

STEP 1. Collection and analysis of available information

- A. What information is available about the species composition of bats in the IP area?
- Q. What information exists about habitats and landform features relevant to bats?
- C. What information exists about the structural elements and characteristics of ecosystems in the IP area?

In the absence of detailed information about bats, a literature reference is made, or if it is not available, an assessment of available habitats in the studied territory is carried out.

If you only have habitat information, the apps help you get an initial idea of what to expect and look for in the field. When searching for available information on the habitats and features of landforms relevant to bats, the expert should focus on data on sites of high insect abundance, existing roosts, known flight corridors, and guiding linear landscape features such as roads, forest clearings, river courses with developed coastal vegetation, etc. Indirect information about potential bat migrations can be provided by data on documented bird migration routes.

STEP 2. Preliminary assessment of the need for additional studies to clarify the degree of risk and potential impact/impact resulting from the implementation of the IP

A. Evaluation of the relevance of the collected information from step 1. Analysis of step 1 (A+B+C).

Q. What bat species can we potentially expect in the IP area?

C. What is the possible function of the landscape features in the IP area during the different periods of the bat life cycle?

D. To identify potential conflicts resulting from the implementation of the IP, as well as direct negative impacts on individuals, populations or functional landscape elements of importance to bats.

STEP 3. Design and Conduct Research on Bats and Related Environmental Functional Elements

A. To determine adequate research methods.

C. To determine a representative period for conducting the survey

C. To determine the intensity of the study depending on the specificity of the objects and the season for research.

D. Conduct field surveys and gather up-to-date information. To interpret the collected information. Analysis of Step 1 (A+B+C) and Step 2 (B+C).

The periods of bat activity that are subject to assessment are the following:

- reproductive period (from the end of May to the end of July);
- period of active communications between summer refuges (June–August);
- activity of local populations (May–September);
- dispersion of colonies and beginning of autumn migrations (August–September);
- autumn migrations and establishment of territories and shelters for mating (September–October);
- spring migration (March–April).

Additional research should provide information on:

- the maximally complete species composition;
- characterization of landscape elements important for bats;
- presence, number and exact location of shelters;

- presence and location of flight corridors and the species that use them;
- presence and location of food habitats.

STEP 4. Final assessment of the impact of the implementation of the PP and measures to prevent, mitigate and compensate for the negative impact

A. To present the conservation status of the established species according to national and international legislation.

C. To determine the species at risk in relation to PP and mainly the potential danger of destruction of individuals and colonies.

C. To locate the habitats and refuges affected by the PP and to assess the main risk factors during the individual stages of the implementation of the PP.

D. To prepare recommendations to reduce the negative impact during the implementation of the IP and to propose alternative solutions for mitigating and compensating the damage

!

SHELTERS

Depending on the season, bats inhabit different shelters. In winter, all species live in shelters with a constant temperature between 2° to 10° C. Such conditions are most often found in water caves, flooded mine galleries and less often in the attics and basements of residential buildings. In spring and autumn they can be found in a wide variety of shelters where the temperature is variable or constant (e.g. abandoned and inhabited residential and industrial buildings, underground bunkers, galleries, drainage and ventilation shafts, pipes, chimneys, hollow pillars, small and large caves, chasms, rock niches, etc.). In the summer, bats prefer refuges with a higher temperature, where they breed. Colonial species are found in caves with large volumes and large entrances, so that at dusk hundreds or thousands of bats can fly out at once. Depending on their habitat preferences, bats are conditionally divided into four main categories:

- Cave-loving - breed and winter exclusively in caves and other underground shelters. They are mainly found in areas with karst, volcanic or sea caves. The number of colonies can reach 100–10,000 copies. in summer and from 50 to 100,000 specimens in winter.

- Forest - reproduce mainly in hollows, crevices and under the bark of trees; some species also winter in caves. They are found wherever there is a broad-leaved, mixed and less often pure coniferous forest that offers enough shelter and a food base. Their number in hollows is usually 10–50 individuals, but many colonies are more or less evenly distributed over a large area.

- Wetlands - due to their high biological potential and rich biodiversity, these are one of the most important feeding habitats for bats. These areas are especially important during the

summer months when thousands of bats hunt above the water surface and are important participants in regional food chains. Most specimens dependent on water areas live in the immediate vicinity or within the boundaries of the areas themselves. They inhabit tree hollows, residential or industrial buildings, caves and other nearby shelters.

- Synanthropic – spend almost their entire life cycle in man-made shelters such as attics, basements, joints, manholes, chimneys, ventilation systems and elsewhere. They are found everywhere in villages, cities, resort towns and other urbanized areas. Colonies of some species vary from 5–20 individuals, of others 50 to 1000 individuals.

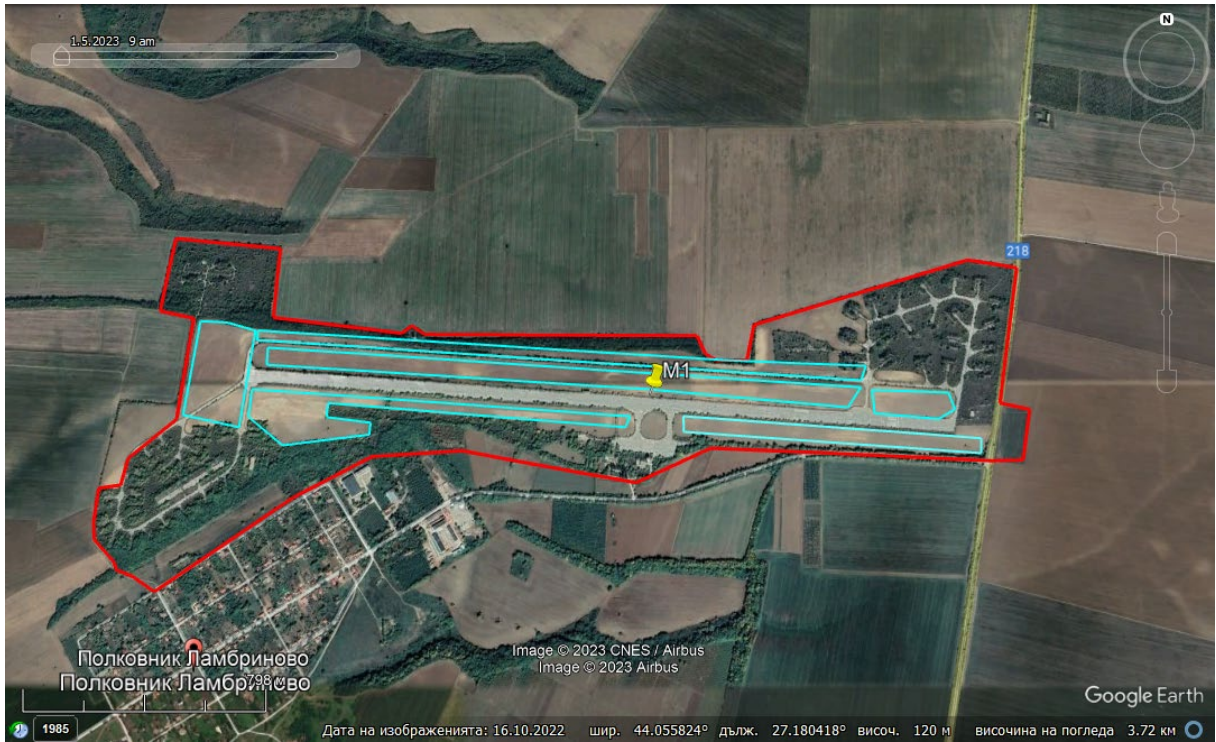
10.1. Assessment of Baseline Conditions

Several potential habitats for both refuges and foraging sites have been identified.

1. Forests - acacia, plum, walnut, beech, elm and oak - at the northern and southern borders of the landfill.

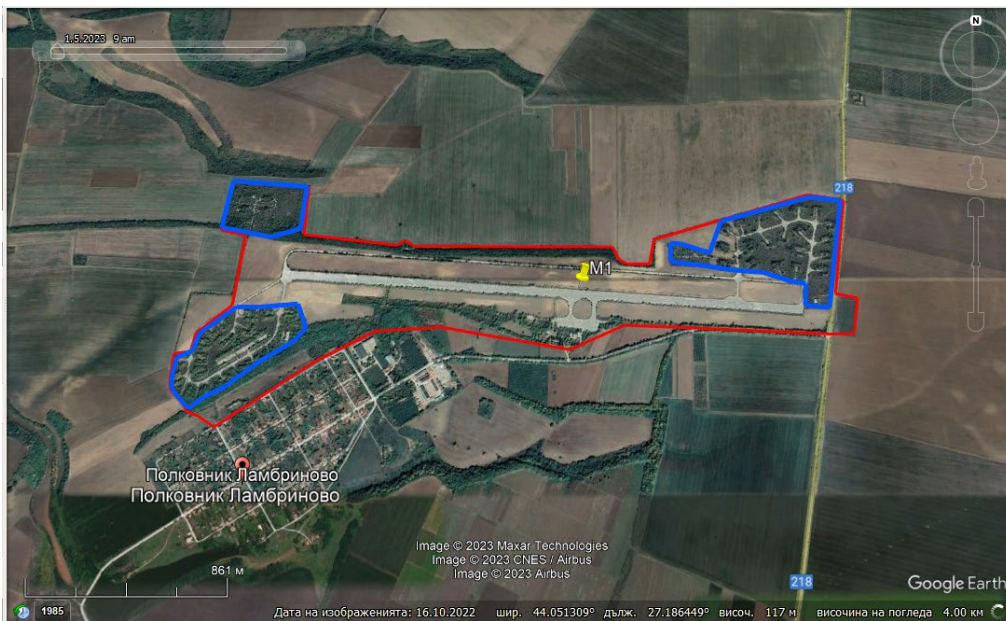


2. Arable fields





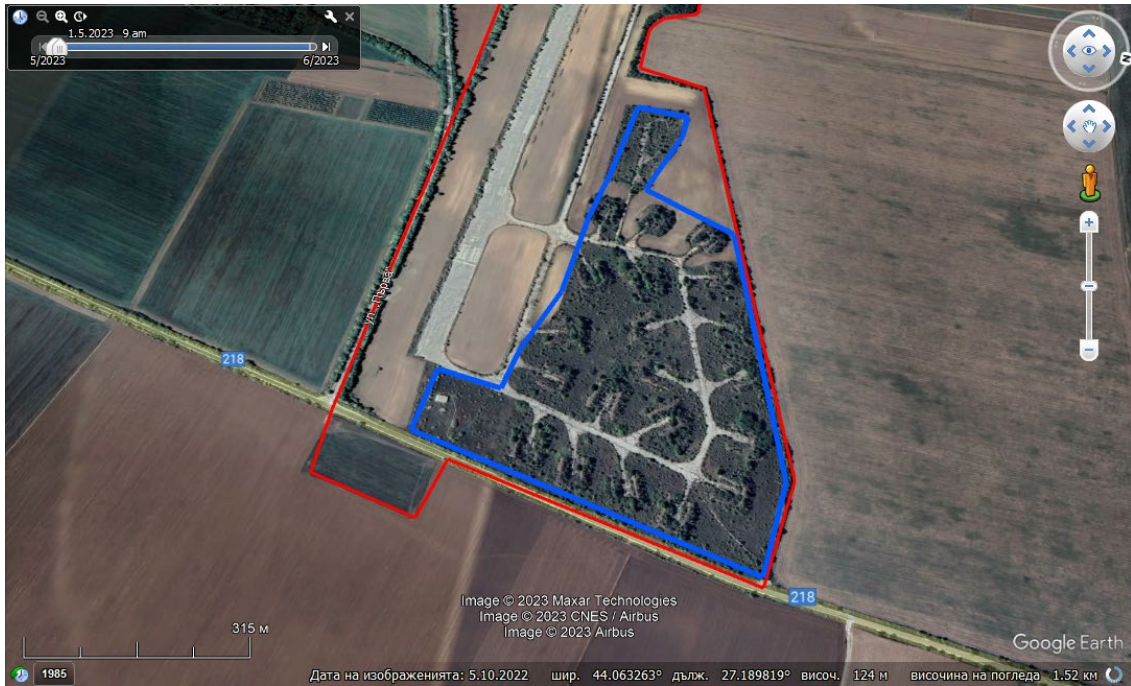
3. Open spaces resembling pastures - mounds of earth that were used to store equipment. Occupied by grass formations and tree and shrub vegetation





4. Abandoned buildings

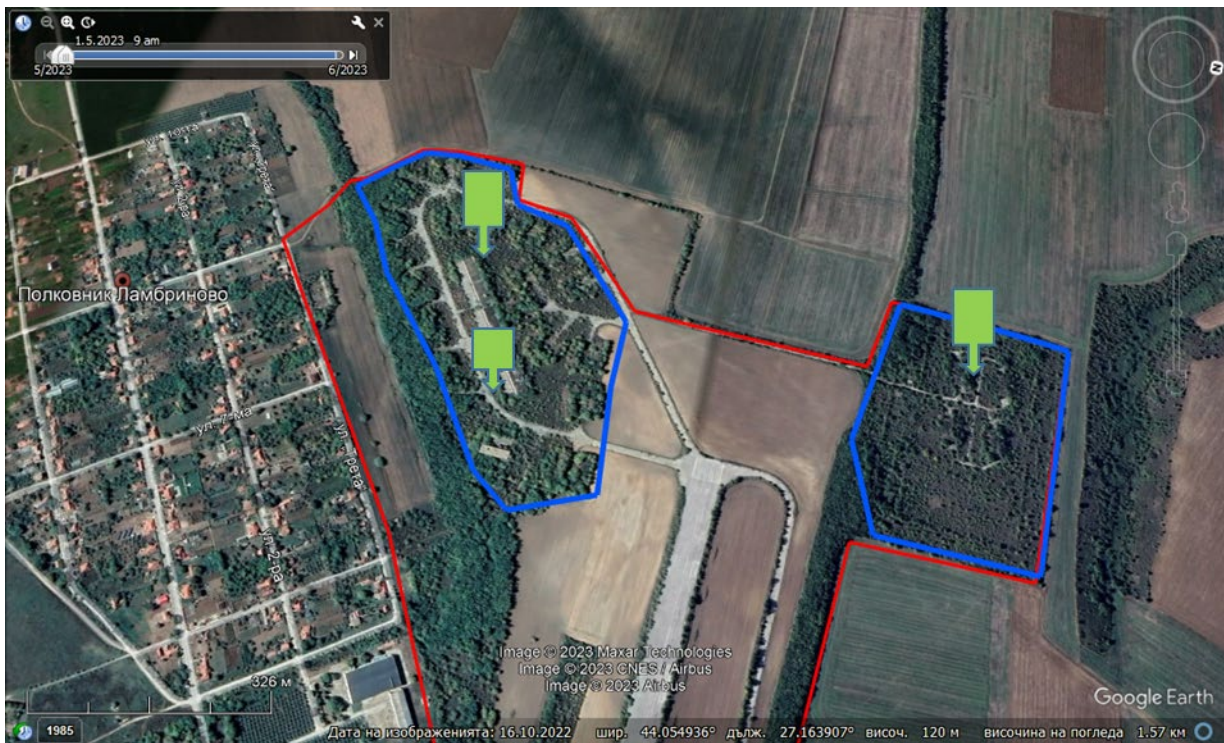
Several buildings have been identified on the ground that were part of the airport infrastructure, but given that the ground clearance activities started in the month of February 2023 and we started monitoring at the end of March 2023 - 90% of them were already demolished. The descriptions made below are based on conversations with the construction teams working on the demolition of these objects.



Concrete service building - east end of the airport



Group of concrete buildings next to the airport tower - southern part of the airport

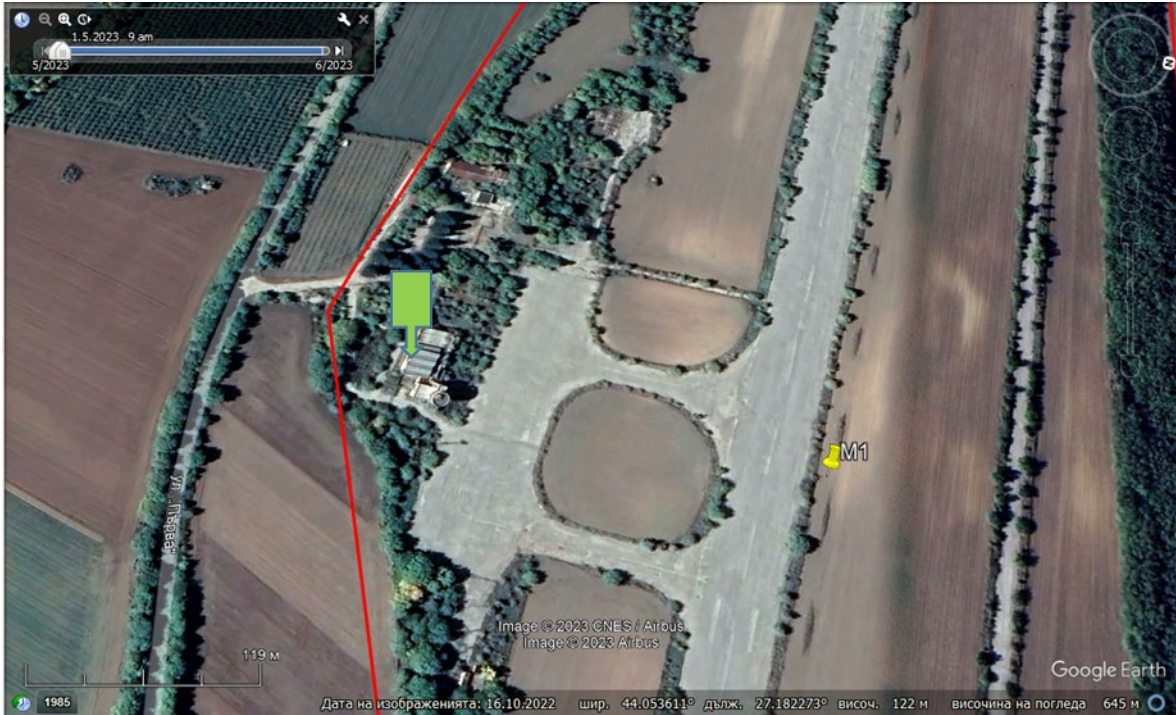


Clusters of concrete service buildings in the western part of the airport

April, 2023

Airport building = airport tower not planned to be part of the FEP project. The contractor did not provide access to it and it was not checked for bats.

May 2023



Airport tower location





Two abandoned buildings at the entrance to the airport from the east.

They were demolished in May 2023 but were checked for bats on 30 March 2023 - no bats or signs of bat activity were found.

10.1.1. Baseline Assessment Methodology

Approach to performing fieldwork and analytical work. Planning.

Bats:

Tracking through recordings with Ultrasonic Detectors is one of the specialized ways to record and identify bats by the sounds they make. This requires an ultrasound detector, a good

auditory memory, special training and practice. The method is suitable for detecting the activity of species that emit a strong and targeted signal. Ultrasounds captured in the field are recorded on digital media and analyzed using special software. The method guarantees "minimal direct impact" on the population and individual specimens. The principle of the ultrasonic detector is that it converts bat sounds that are not perceptible to the human ear into ones that can be heard by humans. There are three types of detectors: heterodyne, frequency division, time expansion, real time.

The bat tracking team consists of experts that are equipped with the following:

1. Bat detectors – AudioMoth 1.2.0, EchoMeter Touch 2, Transect Tranquility и NE612-receiver, Petterson D1000x;
2. Laptop
3. GPS equipments
4. Endoscope
5. Thermo-hygrometer;
6. Research protocols;
7. Record form;
8. Cars

Recordings for the present study were made with an Ultrasound Detector - AudioMoth 1.2.0 and EchoMeter Touch 2 – real time, Transect Tranquility time expansion detector, and the data processing was done with a software product „BatSound” and Kaleidoscope Pro v.5.4.8.

Recordings with the Detectors are made in a time period of 20 min to 1 hour after sunset for the interval from 20:00 to 06:00 (depending on the season) in the dark part of the day when bats are active, applying both spot, and transect method.

Transects records

Transects are performed according to the method iBats - <https://www.bats.org.uk/our-work/national-bat-monitoring-programme/past-projects/ibats>.

One transect was defined, which covers the runways of the former airport, and thus all possible habitats of the bat species that are available on the territory of the FEC fall within the scope of the study. The same is about 5000 meters long.



The same is carried out using the methodology applied in Indicator Bats Program (<http://www.ibats.org.uk/>), as the movement is carried out by a car moving at 25 km/h, in which case a recording is made again with Transect Tranquility time expansion detector or EchoMeter Touch 2 for Android.

After the completion of the transect, recording of sounds from a point is applied, namely: N 44.055134° E 27.182238°, with detector Transect Tranquility time expansion detector or EchoMeter Touch 2 for Android.

Spot records in suitable habitats

The method for studying the ultrasonic activity of bats was applied, using the **AUDIOMOTH 1.2.0** device, which is static and 6-8 locations were determined, where they were placed in the period march-october 2023.

Point-placed AudioMoth 1.2.0 detectors at 8 locations, applying the habitat principle - hedgerows next to fields, single trees near airport runways and fields. It should be noted that at the time of the survey, felling and clearing of trees and bushes is taking place in all parts of the affected area, which will automatically affect the diversity, numbers and activity of bats in the area of the airport.



The method for studying the ultrasonic activity of bats was applied, using the **AUDIOMOTH 1.2.0** device, which is static and 8 locations were determined, where they were placed in the period march-may 2023.

Point-placed AudioMoth 1.2.0 detectors at 8 locations, applying the habitat principle - hedgerows next to fields, single trees near airport runways and fields. It should be noted that at the time of the survey, felling and clearing of trees and bushes is taking place in all parts of the affected area, which will automatically affect the diversity, numbers and activity of bats in the area of the former airport.

№	AUDIOMOTH	X	Y
1	AM01	44.050598°	27.162190°
2	AM02	44.056840°	27.165634°
3	AM 03	44.056376°	27.176812°
4	AM 04	44.056118°	27.186516°
5	AM 05	44.059062°	27.198644°
6	AM 06	44.054240°	27.191086°
7	AM 07	44.053313°	27.182418°

8	AM 08	44.055127°	27.173260°
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After the constructor cut down the vegetation the experts decided to reduce the number of AudioMoth devices to 6.

AudioMoth 1.2.0 locations in 6 points in the period from May-October:

№	AUDIOMOTH	X	Y
1	AM01	44.050598°	27.162190°
2	AM02	44.056840°	27.165634°
3	AM 03	44.056376°	27.176812°
4	AM 04	44.056118°	27.186516°
6	AM 06	44.054240°	27.191086°
8	AM 08	44.055127°	27.173260°

Recordings with the AM Detectors are made in a time period of 20 min to 1 hour after sunset for the interval from 20:00 to 06:00 (depending on the season) after nightfall when bats are active, applying both methodology spot(fix points AM) and transect method.

The device settings are:

Firmware : AudioMoth-Firmware-Basic (1.8.0)

Time zone : UTC+3

Sample rate (Hz) : 96000

Gain : Medium

Sleep duration (s) : 5

Recording duration (s) : 55

Active recording periods : 2

Recording period 1 : 00:00 - 03:00 (UTC)

Recording period 2 : 17:00 - 24:00 (UTC)

Filter : High-pass (12.0kHz)

Trigger type : -

Threshold setting : -

Minimum trigger duration (s) : -

Enable LED : Yes

Enable low-voltage cut-off : Yes

Enable battery level indication : Yes

Always require acoustic chime : No

Use daily folder for WAV files : No

Disable 48Hz DC blocking filter : No

Enable energy saver mode : No

Enable low gain range : Yes

Enable magnetic switch : No

Enable GPS time setting : Yes

poor, considering that it is an agrocenosis and a former airport, which is crossed by small field protection belts and small forests, 90% of which are of shoot origin - acacia.

In the PP area there are no caves, forests of conservation importance and high hills terrains. The nearest cave is located in the area of the village of Bogorovo - Hajdushka, which is 10 km east of the PP site. In the affected territory, it is expected to register bats from the following groups, in accordance to their habitats:

~ Forest - bats breed mainly in hollows, crevices and under the bark of trees; some species also winter in caves. They are found wherever there is a broad-leaved, mixed and less often pure coniferous forest that offers enough shelter and a food base. Their number in the hollows is usually 10-50 individuals, but many colonies are more or less evenly distributed over a large area.

~ Synanthropic – spend almost their entire life cycle in man-made shelters such as attics, basements, joints, manholes, chimneys, vents, etc. They are found everywhere in villages, cities, resort towns and other urbanized areas. Colonies of some species vary from 5–20 individuals, of others 50 to 1000 individuals.

Some basic characteristics are known about the ecology of bats:

Hunting (food) habitats

All European bat species are insectivorous. They feed mainly on insects from the orders Coleoptera, Lepidoptera, Diptera, Orthoptera, etc., as well as other arthropods (spiders, centipedes). Individual species of bats hunt using different "strategies" - some fly high in open space, others gather insects from the surface of vegetation, others hunt insects from the water surface. In general, the main preferred types of hunting habitat for all species are open bodies of water (including slow-flowing rivers), riparian woody vegetation, forest edges and the forests themselves.

Flight corridors

Data on how bats navigate and what flight corridors they use to reach their hunting grounds or alternative roosts are extremely scarce. It is assumed that landmarks can be various natural and artificial "linear" elements of the landscape, such as rivers, canals, rows of trees, clearings in the forest, etc.

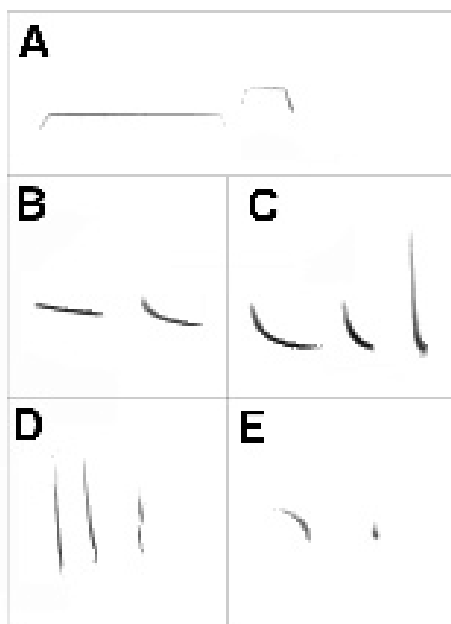
Ultrasonic signals in bats are frequency-modulated (VHF) sounds with a frequency above 18,000 Hz, making them inaudible to the human ear. They are generated by the bats, radiated into space, reflected off surrounding obstacles or prey, and recaptured by the well-developed ears.

Horseshoe bats (Rhinolophidae) emit constant frequency (CF) signals. Smooth-nosed bats (Vespertilionidae) are specialized feeders on frequency-patterned (FM) sounds over a wide range.

The recordings made are processed with the licensed software product "BatSound" and "Kaleidoscope Pro v.5.4.8". The product generates two types of diagrams - Oscillogram and Spectrogram, showing the length and frequency of the recorded sounds, respectively. Bats make high-frequency social sounds and also echolocation sounds. A judgment is made as to whether the sounds are social or echolocation and record the number of both. Although social sounds are very varied, the following simple steps are used to identify social sounds:

1. Social sounds typically contain sequences of descending and ramping frequency-modulated components—for example, every 60ms [6ms].
2. The maximum frequency of social sounds is usually below 3.2 kHz [32kHz].

Echolocation sounds are composed of a single component (although they are emitted in sequence) and have 5 basic forms:



A. Constant Frequency - A constant frequency (CF) ending (and sometimes beginning) with a frequency modulated (FM) section.

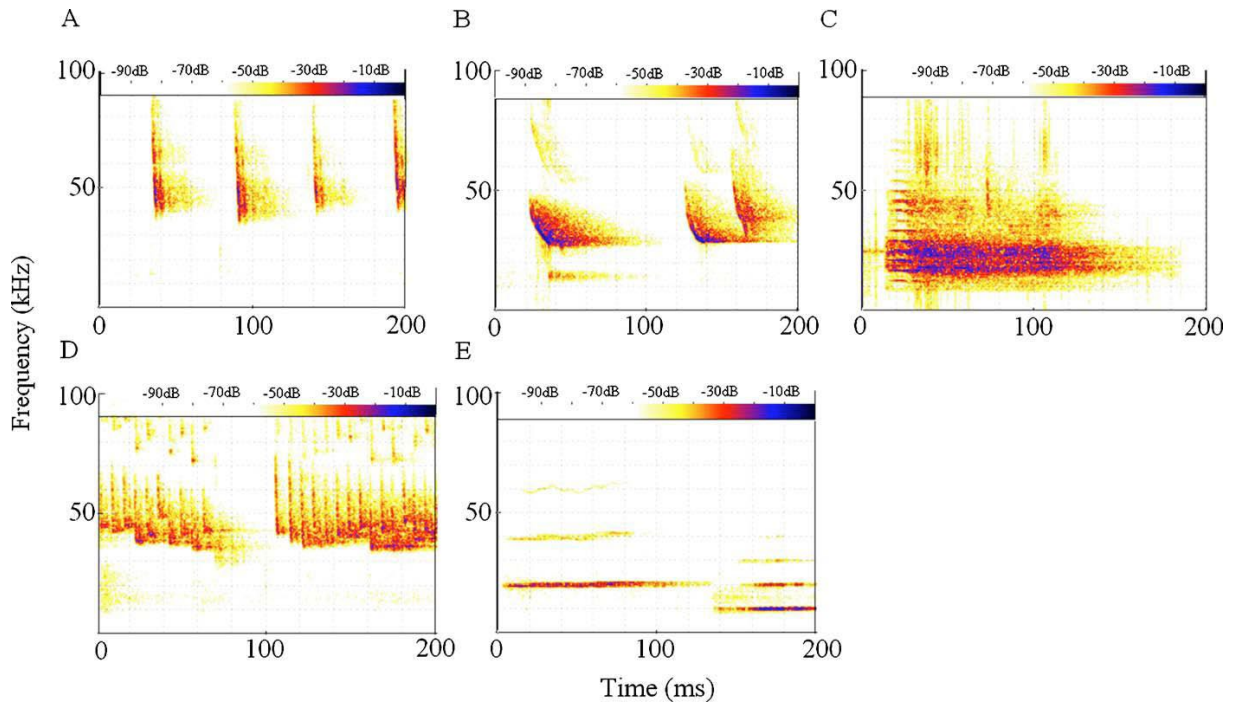
B. Constant or quasi-constant / pseudo-constant quasi-constant (QCF) sound. This part of the sound which is constant frequency /CF/ is always longer than the frequency-modulated FM part.

C. Frequency-modulated signal ending with a constant frequency section - CF. A frequency modulated signal is always longer than or equal to a constant frequency signal.

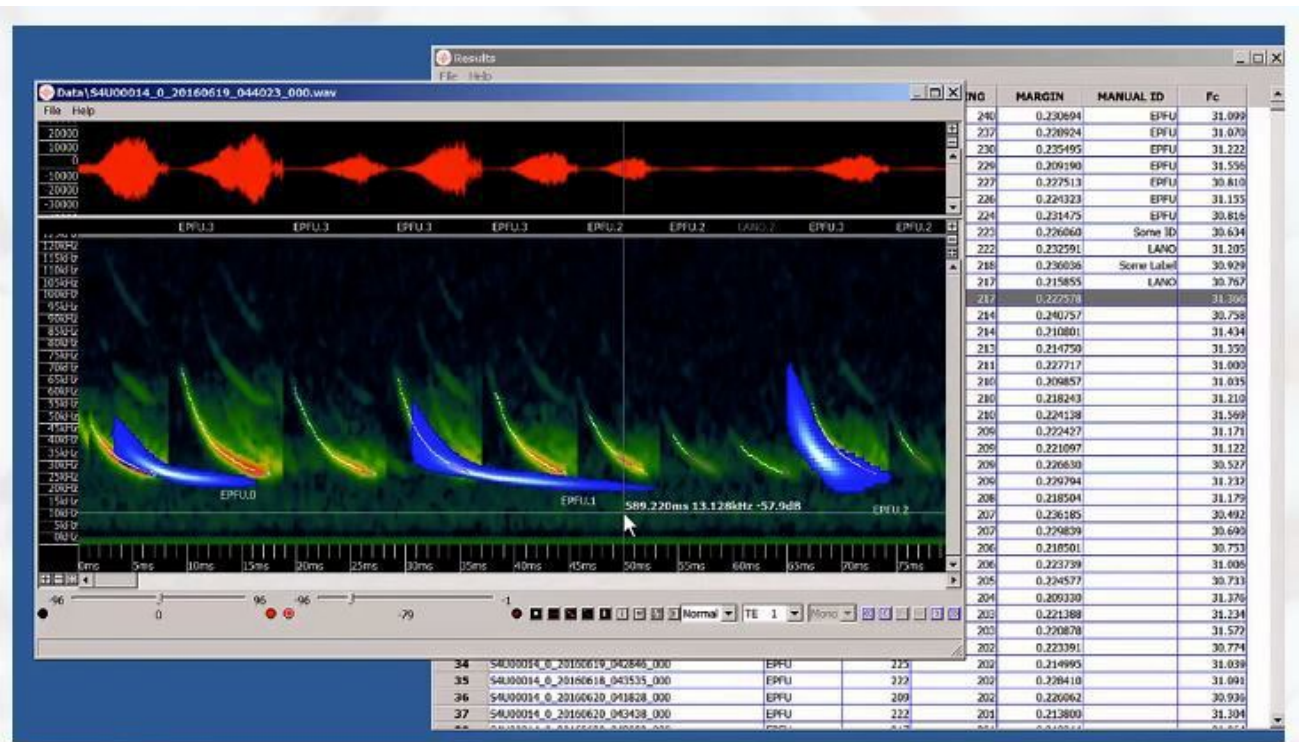
D. Frequency-modulated signal. Sometimes with a small "curve" at the end.

E. Constant or quasi-constant signal passing to

frequency modulated (FM) section.



Echolocation sounds viewed by BatSound and Kaleidoscope Pro v.5.4.8



When reading records with a registered ultrasound, data is extracted for:

- peak frequency

- duration

- intersonic interval

- maximum and minimum frequency

The type of bats is determined by the type of sonogram and the maximum frequency.

10.1.2. Results

Table with results

Family / Scientific name / Common name / IUCN Red List / Regional Status

№	Species	IUCN Red List of Threatened Species	National legislation Biodiversity Act, Annex 3
1.	<i>Barbastella barbastellus</i>	NT	+
2.	<i>Nyctalus noctula</i>	LC	+
3.	<i>Nyctalus leisleri</i>	LC	+
4.	<i>Pipistrellus kuhlii</i>	LC	+
5.	<i>Pipistrellus nathusii</i>	LC	+
6.	<i>Pipistrellus pipistrellus</i>	LC	+
7.	<i>Pipistrellus pygmaeus</i>	LC	+
8.	<i>Hypsugo savii</i>	LC	+
9.	<i>Tadarina teniotis</i>	LC	+
10.	<i>Myotis nattereri</i>	LC	+
11.	<i>Plecotus austriacus</i>	NT	+
12.	<i>Rhinolophus hipposideros</i>	LC	+
13.	<i>Rhinolophus ferrumequinum</i>	LC	+
14.	<i>Eptesicus serotinus</i>	LC	+

Field surveys were carried out in the period:

1. Migration

For spring which coincide with the migration period of the species, but partially the data from the month of May 2023 and with registrations of the local populations.

Monitoring dates using either mobile detectors or audiomoth devices, and roost search:

- 29-31 March 2023

- 18-21 April 2023

- 24-28 April 2023

- 11-14 May 2023,

- 29-31 March 2023

During monitoring were found 5 species established on the territory of the project PP. These are:

1. *Nyctalus noctula*

2. *Nyctalus leisleri*

3. *Pipistrellus kuhlii*

4. *Pipistrellus nathusii*

5. *Tadarina teniotis*

The territory is subject to intense human activity – equipments for earthmoving and loading equipment related to the removal of tree, shrub and grass vegetation in the eastern and western sections of the PP test site. In these areas, the elements of the airport infrastructure are also being actively removed - earth embankments, which serve to search for food and landmarks for bats. This defines the territory as unattractive to bats.

2. The meteorological conditions at the end of March are characterized by frequent weather changes, alternating snow, rain, wind and very low temperatures atypical for the season. As on 29/03/2023, the temperature at the beginning of the records was about 3.6 °C, which is quite low compared to the accepted literature data for bat activity, of 8 °C. This affects the activity of bat species and was extremely low, which can be seen from the registration hours of the species.

3. The most registrations inputs came from *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

4. *Nyctalus noctula* and *Nyctalus leisleri* can be distinguished as migrant species. *Pipistrellus kuhlii*, is considered to be inhabiting buildings in the village of Lambrinovo.

5. The records of *Pipistrellus nathusii* and *Tadarina teniotis*, it can be considered as accidental and even an error in the determination (see Pocora, Irina & Pocora, Viorel. (2011).

6. The 3 devices installed - AM05, AM06 and AM07 at the eastern end of the former airport, do not have a single registration, but there is no clearly defined reason for this.

7. There is a distinct and tangible increase in activity on 30.03.2023 and 31.03.2023, given the increase in temperatures (over 6-8 °C at night) and normalization of the weather.

8. In principle, the methods, points and tracks determined during the initial planning should be applied, and if in the month of April or May, the vegetation is completely removed, wooden stakes should be placed on which the AUDIOMOTH devices can be attached. For this purpose, the constructor was informed.

Period - 18-21 April – iBats and 24-28 April – AUDIOMOTH devices:

Results, there were 14 species established on the territory of the project PP. These are:

1. *Barbastella barbastellus*
2. *Nyctalus noctula*
3. *Nyctalus leisleri*
4. *Pipistrellus kuhlii*
5. *Pipistrellus nathusii*
6. *Pipistrellus pipistrellus*
7. *Pipistrellus pygmaeus*
8. *Hypsugo savii*
9. *Tadarina teniotis*
10. *Myotis nattereri*
11. *Plecotus austriacus*
12. *Rhinolophus hipposideros*
13. *Rhinolophus ferrumequinum*
14. *Eptesicus serotinus*

AUDIOMOTH results from 24-28.04.2023

AUDIOMOTH devices are set to record from 18-21/04/2023, but due to adverse weather conditions and storms, the settings were compromised and there are no recordings except for AM06. Actions were taken for recordings in the period 24-28.04.2023, and again there is a problem, but with only one device, AM07, on which there are no recordings.

The registrations of bat species on 24/04/2023 are very few and the reason for this is a thunderstorm accompanied by rain almost all night, which stopped the local populations of bats from coming out to feed and has stopped the migratory species.

On 25.04.2023, 26.05.2023 and 28.04.2023, with favorable weather, the registrations of both local species and migrants significantly increase. On 27/04/2023, due to partial rainfall, registrations significantly decreased. First time in the PP area are recorded the specimens of *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Plecotus austriacus*, *Hypsugo savii* and *Barbastella barbastellus*.

Analysis and conclusions

For the area, there are no literature data on previous studies of the bat fauna.

As a summary of the obtained results, it can be concluded that:

1. The territory is subject to active human activity - use of earthmoving and loading equipment related to the removal of tree, shrub and grass vegetation in the eastern and western sections of the PP site. In these areas, the elements of the former airport infrastructure are also being actively removed - earth embankments, which serve to search for food and landmarks for bats. A significant amount of tree and shrub vegetation was removed, which significantly changed the landscape, the possibilities for temporary and permanent shelters and foraging sites. This defines the territory as unattractive to bats.

2. The meteorological conditions in the period 25-27.04.2023 are excellent and clear migration flows of the species *Nyctalus leisleri* and *Pipistrellus nathusii* are clearly visible, with the range of the most active migration being between 00:00 and 04:00 .

3. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii* *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

4. *Nyctalus noctula*, *Nyctalus leisleri* and *Pipistrellus nathusii* can be distinguished as migrant species. *Pipistrellus kuhlii*, we consider to be local populations inhabiting buildings in the village of Lambrinovo.

5. The records of *Pipistrellus nathusii* and *Tadarina teniotis*, can be considered as accidental and even an error in the determination (see Pocora, Irina & Pocora, Viorel. (2011)).

6. The installed device - AM07, does not have a single registration, probably for technical reasons.

Period - 11-14 May 2023

Results, there were 11 species established on the territory of the project PP. These are:

1. *Nyctalus noctula*
2. *Nyctalus leisleri*
3. *Pipistrellus kuhlii*
4. *Pipistrellus nathusii*
5. *Pipistrellus pipistrellus*
6. *Pipistrellus pygmaeus*
7. *Hypsugo savii*
8. *Tadarina teniotis*
9. *Plecotus austriacus*
10. *Rhinolophus hipposideros*
11. *Eptesicus serotinus*

Analysis

As a summary of the obtained results, it can be concluded that:

1. The territory is still subject to intense human activity - use of earthmoving and loading equipment related to the removal of tree, shrub and grass vegetation in the eastern and western sections of the FEP test site. In these areas, the elements of the former airport infrastructure are also being actively removed - earth embankments, which serve to search for food and landmarks for bats. A significant amount of tree and shrub vegetation was removed, which significantly changed the landscape, the possibilities for temporary and permanent shelters and foraging sites. This defines the territory as unattractive to bats.

2. The meteorological conditions in the period 11-15.05.2023 are excellent and clear migration flows of the species *Nyctalus leisleri* and *Nyctalus noctula* are clearly visible, with the range of most active migration being between 00:00 and 04:00 , but registrations are also intertwined with local populations.

3. The most registrations inputs were recorded in the period 12-14.05.2023.

4. The most registrations inputs were established for *Eptesicus serotinus*, *Hypsugo savii* *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

5. *Nyctalus noctula*, *Nyctalus leisleri* and *Pipistrellus nathusii* can be distinguished as migrant species. *Pipistrellus kuhlii*, are considered to be local populations inhabiting buildings in the village of Lambrinovo.

6. The installed device - AM07, does not have a single registration, probably for technical reasons. Some registrations are missing also for AM05 and AM08 as well.

7. In principle, the methods, points and tracks determined during the initial planning should be applied, as if in the case that in the month of May, the vegetation is completely removed, wooden stakes should be placed on which to fasten the AUDIOMOTH devices.

Conclusion migration period :

As a generalization of the results of the studies carried out during the migration, the conclusion is forced that there is no clearly separated migration route through the territory, and this is shown by the data that the activity of bats begins immediately after sunset and continues until around 10:00 p.m. Activity is reported again after 04:00 a.m. until sunrise, which indicates that the recorded bat activities are not due to a migration corridor over the areas planned for the construction of the PP, but are probably the local populations in the area of the village of Lambrinovo and the area . The identified species are mainly from the synanthropic group, with a very small part from the cave-loving group, such as *Rhinolophus hipposideros* (4 individuals) and *Rhinolophus ferrumequinum* (2 individuals), which may be due to the presence of abandoned houses in the area of Lambrinovo or small local movements of local populations in the area of the Khrsovska Reka natural territory, which is located about 15-20 km east of the territory of the PP, and the recorded individuals are for the entire period of migration and expected around the existing strips of trees, where AM02, AM03 were placed.

For the species *Nyctalus noctula*, *Nyctalus leisleri* and *Pipistrellus nathusii*, which are considered to be typical migrants, it can be summarized that the established records are very few and can rather be determined to be due to local populations rather than migrating individuals, as there are synanthropic habitats for them in the nearby settlement - the village of Lambrinovo.

Autumn

- 11-15 August – AUDIOMOTH devices and 11-12, 17-18 August – iBats devices
- 02-05 September – AUDIOMOTH devices and 02, 09, 19-20 September – iBats devices
- 17-23 October – AUDIOMOTH devices and 17, 23-25 October – iBats devices

Period - 11-15 August – AUDIOMOTH devices and 11-12, 17-18 August – iBats devices

Results. There were 9 species established on the territory of the project PP. These are:

1. *Nyctalus noctula*
2. *Nyctalus leisleri*
3. *Pipistrellus kuhlii*
4. *Pipistrellus pipistrellus*
5. *Pipistrellus pygmaeus*
6. *Hypsugo savii*
7. *Plecotus austriacus*
8. *Rhinolophus ferrumequinum*
9. *Eptesicus serotinus*

As a summary of the obtained results, it can be concluded that:

1. During this period, the effects of the preliminary clean-up activities (from spring) carried out in the territory of the PP, influenced the population of bats, as the grass vegetation was removed from all areas and the insect diversity was reduced and the territory was not attractive for bats and the registrations were significantly reduced, although the diversity of species was preserved compared to spring data.

2. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii* *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

3. *Nyctalus noctula* and *Nyctalus leisleri* can be distinguished as migrant species. For the species *Nyctalus noctula*, *Nyctalus leisleri* and *Pipistrellus nathusii*, which are considered to be typical migrants, it can be summarized that the established records are very few and can rather be determined to be due to local populations rather than migrating individuals, as there are synanthropic habitats for them in the nearby settlement - the village of Lambrinovo.

4. *Pipistrellus kuhlii*, we consider to be local populations inhabiting buildings in the village of Lambrinovo.

Period - 02-05 September – AUDIOMOTH devices and 02, 09, 19-20 September – iBats devices

Results. There were 9 species established on the territory of the project PP. These are:

1. *Nyctalus noctula*

2. *Nyctalus leisleri*

3. *Pipistrellus kuhlii*

4. *Pipistrellus pipistrellus*

5. *Pipistrellus pygmaeus*

6. *Hypsugo savii*

7. *Plecotus austriacus*

8. *Myotis nattereri*

9. *Eptesicus serotinus*

1. During this period, the effects of the preliminary clean-up activities (from spring) carried out in the territory of the PP were still influencing the population of bats, as the grass vegetation was removed from all areas and the insect diversity was reduced and the territory was not attractive for bats and the registrations were significantly reduced, although the diversity of species was preserved compared to spring data.

2. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii* *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

3. *Nyctalus noctula* and *Nyctalus leisleri* can be distinguished as migrant species. For the species *Nyctalus noctula*, *Nyctalus leisleri*, which are considered to be typical migrants, it can be summarized that the established registrations are a very small number and rather they can be determined to be due to local populations and not to migrating individuals, since there are synanthropic habitats for them in the nearby settlement - the village of Lambrinovo.

4. *Pipistrellus kuhlii*, we consider to be local populations inhabiting buildings in the village of Lambrinovo.

5. The registrations made with iBats devices from the point M1 revealed more inputs than Audiomoth, which can be explained by the fact that at this time of the year the local populations are

actively foraging in open spaces in order to accumulate fat for hibernation, and the established species prefer open spaces.

Results - 17-23 October – AUDIMOTH devices and 17, 23-25 October – iBats devices

Results. There were 10 species established on the territory of the project PP. These are:

1. *Nyctalus noctula*
2. *Nyctalus leisleri*
3. *Pipistrellus kuhlii*
4. *Pipistrellus pipistrellus*
5. *Pipistrellus pygmaeus*
6. *Hypsugo savii*
7. *Plecotus austriacus*
8. *Myotis nattereri*
9. *Eptesicus serotinus*
10. *Rhinolophus ferrumequinum*

1. During this period, the effects of the preliminary clean-up activities (from spring) carried out in the territory of the PP were still influencing the population of bats, as the grass vegetation was removed from all areas and the insect diversity was reduced and the territory was not attractive for bats and the registrations were significantly reduced, although the diversity of species was preserved compared to spring data.

2. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

3. *Nyctalus noctula* and *Nyctalus leisleri* can be distinguished as migrant species. For the species *Nyctalus noctula*, *Nyctalus leisleri*, which are considered to be typical migrants, it can be summarized that the established registrations are a very small number and rather they can be determined to be due to local populations and not to migrating individuals, since there are synanthropic habitats for them in the nearby settlement - the village of Lambrinovo.

4. *Pipistrellus kuhlii*, we consider to be local populations inhabiting buildings in the village of Lambrinovo.

5. The registrations made with iBats devices from the point M1 still revealed more inputs than Audiomoth devices, which can be explained by the fact that at this time of the year the local populations are actively foraging in open spaces in order to accumulate fat for hibernation, and the established species prefer open spaces.

Conclusion for autumn

As a generalization of the results of the studies carried out during the autumn, the conclusion is drawn that there is no clearly separated migration route through the territory, and this is shown by the data that the activity of bats begins immediately after sunset and continues until around 10:00 p.m. Activity is reported again after 04:00 a.m. until sunrise, which indicates that the reported bat activities are not due to a migration corridor over the areas planned for the construction of the FPP, but are probably the local populations in the area of the village of Lambrinovo and the area . The identified species are mainly from the synanthropic group, with a very small part from the cave-loving group, such as *Rhinolophus hipposideros* (4 individuals) and *Rhinolophus ferrumequinum* (2 individuals), which may be due to the presence of abandoned houses in the area of Lambrinovo or small local movements of local populations in the area of the Hersovska Reka natural territory, which is located about 15-20 km east of the territory of the PP, and the recorded individuals are for the entire period of migration and expected around the existing strips of trees, where AM02, AM03 have been placed and also AM04.

For the species *Nyctalus noctula*, *Nyctalus leisleri* and *Pipistrellus nathusii*, which are considered to be typical migrants, it can be summarized that the established records are very few and can rather be determined to be due to local populations rather than migrating individuals, as there are synanthropic habitats for them in the nearby settlement - the village of Lambrinovo.

2. Breeding period and displacement of colonies

- 19-22 May – AUDIOMOTH devices and 29-31 May – iBats devices

Results. There were 10 species established on the territory of the project PP. These are:

1. *Nyctalus noctula*

2. *Nyctalus leisleri*

3. *Pipistrellus kuhlii*

4. *Pipistrellus nathusii*?

5. *Pipistrellus pipistrellus*

6. *Pipistrellus pygmaeus*

7. *Hypsugo savii*

8. *Plecotus austriacus*

9. *Rhinolophus ferrumequinum*

10. *Eptesicus serotinus*

Analysis

For the area, there are no literature data on previous studies of the bat fauna.

As a summary of the obtained results, it can be concluded that:

1. The territory is subject to intense human activity - use of earthmoving and loading equipment related to the removal of tree, shrub and grass vegetation in the eastern and western sections of the FEP test site. In these areas, the elements of the airport infrastructure are also being actively removed - earth embankments, which serve to search for food and landmarks for bats. A significant amount of tree and shrub vegetation was removed, which significantly changed the landscape, the possibilities for temporary and permanent shelters and foraging sites. This defines the territory as unattractive to bats.

3. The most registrations were recorded between 00:00 and 04:00, but registrations are also intertwined with local populations.

4. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri*.

5. Recordings by iBats are much fewer than by AudioMoth, as they are located in characteristic habitats, but overall there is an even distribution of species across all six locations.

6. Despite the removal of vegetation and the corresponding reduction in insect abundance, the species use the territories to search for food or fly over them when moving to the neighboring territories, which are agricultural lands - wheat, corn and sunflower or orchards.

7. The records of *Pipistrellus nathusi*, we can consider as accidental and even an error in the determination (see Pocora, Irina & Pocora, Viorel. (2011).

- 21-26 June – AUDIOMOTH and 23-25 June – iBats

Thus, there are 10 species established on the territory of the project FEC. These are:

1. *Nyctalus noctula*

2. *Nyctalus leisleri*

3. *Pipistrellus kuhlii*
4. *Pipistrellus pipistrellus*
5. *Pipistrellus pygmaeus*
6. *Hypsugo savii*
7. *Plecotus austriacus*
8. *Rhinolophus ferrumequinum*
9. *Rhinolophus hipposideros*
10. *Eptesicus serotinus*

Analysis and conclusions

For the area, there are no literature data on previous studies of the bat fauna.

As a summary of the obtained results, it can be concluded that:

1. The territory is subject to intense human activity - use of earthmoving and loading equipment related to the removal of tree, shrub and grass vegetation in the eastern and western sections of the FEP test site. In these areas, the elements of the airport infrastructure are also being actively removed - earth embankments, which serve to search for food and landmarks for bats. A significant amount of tree and shrub vegetation was removed, which significantly changed the landscape, the possibilities for temporary and permanent shelters and foraging sites. This defines the territory as unattractive to bats.
2. The most registrations were recorded between 00:00 and 04:00, but registrations are also intertwined with local populations.
3. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri* – which are local populations inhabiting the territory of the village of Lambrinovo and they use the territory of the FEC to search for food.
4. Despite the removal of vegetation and the corresponding reduction in insect abundance, the species use the territories to search for food or fly over them when moving to the neighboring territories, which are agricultural lands - wheat, corn and sunflower or orchards.
5. The registrations of *Rhinolophus ferrumequinum* (7 registrations) and *Rhinolophus hipposideros* (2 registrations) can be explained by small local populations in abandoned buildings or inhabited basements in the nearby village of Lambrinovo. The species have been established at AM 2, 3 and 4, which is the tree belt ecotone immediately adjacent to the northern boundary of the FPP site.

- 13-17 July – AUDIMOTH and 15-17 July - iBats

Thus, there are 6 species established on the territory of the project FEC. These are:

1. *Nyctalus noctula*

2. *Nyctalus leisleri*

3. *Pipistrellus kuhlii*

4. *Pipistrellus pygmaeus*

5. *Hypsugo savii*

6. *Eptesicus serotinus*

Analysis and conclusions

For the area, there are no literature data on previous studies of the bat fauna.

As a summary of the obtained results, it can be concluded that:

1. The territory is subject to intense human activity - use of earthmoving and loading equipment related to the removal of tree, shrub and grass vegetation in the eastern and western sections of the FEP test site. In these areas, the elements of the airport infrastructure are also being actively removed - earth embankments, which serve to search for food and landmarks for bats. A significant amount of tree and shrub vegetation was removed, which significantly changed the landscape, the possibilities for temporary and permanent shelters and foraging sites. This defines the territory as unattractive to bats.

2. The most registrations were recorded between 00:00 and 04:00, but registrations are also intertwined with local populations.

3. The most registrations were established for *Eptesicus serotinus*, *Hypsugo savii*, *Pipistrellus kuhlii*, *Nyctalus noctula* and *Nyctalus leisleri* – which are local populations inhabiting the territory of the village of Lambrinovo and they use the territory of the FEC to search for food.

4. Despite the removal of vegetation and the corresponding reduction in insect abundance, the species use the territories to search for food or fly over them when moving to the neighboring territories, which are agricultural lands - wheat, corn and sunflower or orchards.

5. The registrations of the number of species and the number of registrations compared to the month of June are significantly less in number and this can be explained by the displacement of the populations and preference for other places in the area that are attractive to bats for the purpose of searching for food. The decrease in insect abundance as a result of the removal of vegetation in the territory of the PP led to a decrease in the number of feeding species.

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